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PROBLEMS IN EUGENICS.

Papers communicated to the

First International Eugenics Congress

HELD AT

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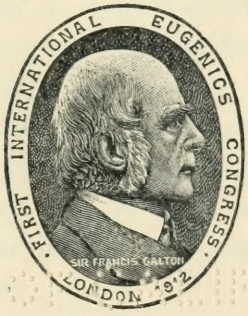
July 24th to 30th, 1912.



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PREFACE.

The main objects hoped to be attained by the Eugenics Education Society in organising the First International Congress of Eugenics were to make more widely known to the public the aims of Eugenists and to afford an opportunity to those engaged in the scientific study of this question, of meeting together and conferring with each other. With this object in view, and in order to induce the leading eugenists throughout the world to take part in our deliberations, a hope was expressed that those interested in these questions in various countries would form themselves into Consultative Committees in connection with the Congress. The response made to this appeal was most gratifying. As soon as these Committees were formed they were requested to nominate a strictly limited number of readers of papers for each Country, the like service being performed at home by the Organising Committee of the Congress. To the writers of these papers, as well as to those who have undertaken to take part in the discussions, must be attributed whatever beneficial results the Congress will produce, and to them we owe a deep debt of gratitude, as well as to the Consultative Committees for securing their services.

A sufficient number of communications having been promised, it was felt that in order to make them of the greatest possible use, the volume containing them should, if possible, be made available for members of the Congress during its sittings. This result has been obtained, but only by means of unremitting and unstinted exertions on the part of all concerned. It is hoped that the unavoidable signs of haste will not materially impair the utility of this work.

This opportunity must also be taken for expressing the thanks of the Organising Committee to the many societies and the many individuals who have given much valuable assistance. First to be mentioned must be the Senate of the University of London for having generously granted the free use of halls and rooms. Without such an admirable meeting place in view, the organisation of the Congress on its actual scale would have presented insuperable difficulties.

The Organising Committee wishes to take this opportunity of expressing its deep sense of gratitude to all those who have so kindly helped in the preparation of this volume, by translating the papers from the original languages in which they were communicated, and various other ways, especial thanks are due to Mr. Balzarotti, Miss James, Professor J. A. Lindsay, Mr. H. Rand, Miss Kate Smith, Dr. Edgar Schuster, Mr. C. Stock, Dr. Douglas White and Mr. Dixon Kingham. I would also add my personal thanks to many voluntary workers and to the members of the office staff, who have all worked so loyally during a period of great strain.

SYBIL GOTTO,

Hon. Secretary.

INTRODUCTION.

In issuing the invitations for this Congress, only the most general indication of the objects aimed at was given. Eugenics, as Sir Francis Galton termed the study of the agencies under social control that may improve or impair the racial qualities of future generations, presents, it was stated, problems of the utmost social importance. At present the most urgent need is for more knowledge, both of the facts of heredity and of the effects of social institutions in causing racial change. As knowledge accrues, it must be disseminated and translated into action. The imparting of such knowledge would constitute a great advance in education: for both private individuals and public bodies have yet to be impressed with the gravity of the situation, and induced to act on eugenic principles. Ultimately it may be possible to induce Society to adopt a well-considered eugenic policy and to carry out reforms on eugenic lines. To attain these ends, however, it is necessary that those who are alive to the dangers of the present social situation should combine together for the purpose of exchanging views, and of discussing concerted schemes of action. This is the basis on which this meeting is about to assemble.

Nothing, it will be observed, either in the foregoing statements, or in the method of nominating the readers of papers mentioned in the Preface, implies the adherence to any fixed eugenic creed on the part of those attending the Congress. Every reader and every speaker is solely responsible for his own utterances, and individuals and societies must not be held to be in the least degree compromised by the expression in this volume of any views to which they dissent.

In so new a field, wide differences of opinion as to the methods to be adopted are certain to exist, and it is only by a tolerant consideration of all these divergent views that the true path of progress will ever be discovered.

As this is written before the Congress meets it is useless to attempt to forecast its results. The earnest hope may, however, be expressed that, as regards definite practical result, something will be accomplished in the direction of hastening the advent of those many reforms which are needed to ensure the continued progress of the race as regards its inborn qualities ; whilst, in the even more important field of morals, we trust that our efforts may tend to enforce the necessity of far greater attention being paid in future to the duties which each generation owes to posterity in view of our increasing knowledge of the laws of heredity.

LEONARD DARWIN,

President.

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Royal University of Padua	Professor Vitale Tedescho.
Royal College of Surgeons	Mr. G. H. Makins, C.B.
Royal Society of Medicine	Sir George Savage, M.D.
Royal Statistical Society	Dr. Dudfield.
Royal Surgical Aid Society	Mr. Henry Allhusen. Rev. Professor Green.
Société Belge de Pédetechnie	M. le Dr. Ensch.
Société Nationale des Professeurs de français en Angleterre	Monsieur A. Perret.
Société Genevoise de Patronage des Aliénés	M. le Dr. P. G. Ladame.
Society of Woman Journalists	Mrs. Bedford Fenwick.
Society of Medical Officers of Health	Dr. A. Bostock-Hill.
Society for the Study of Inebriety	Dr. Theo. B. Hyslop, M.D., C.M., F.R.S.E. Dr. T. Kelynack.
St. Pancras School for Mothers	Lady Meyer. Mr. Forman.

Delegates—*Continued.*

Solvay Institute of Sociology	DR. LOUIS QUERTON.
State of Colorado	MR. D. DE WITT FORWARD.
State of Connecticut	PROF. ERNEST W. BROWN, Sc.D., F.R.S.
State of Michigan	DR. A. W. HEWLETT.
Tower Hamlets Dispensary	DR. E. LE MAISTRE.
Union des Associations Internationales, Brussels	MADAME VAN SCHELLE.
University of Aberdeen	PROF. A. J. THOMSON.
University of Barcelona	PROFESSOR VALENTINI Y VIVO.
University of Bristol	PROFESSOR C. LLOYD MORGAN, F.R.S.
University of Cambridge	PROFESSOR PUNNETT.
University of Edinburgh	RT. HON. A. J. BALFOUR.
University of Glasgow	DR. W. E. AGOR.
University of Kyoto	SANJURO TOMONAGE.
University of London	DR. F. TAYLOR, M.D., F.R.C.P.
University of Minnesota	PROFESSOR S. G. SMITH.
University of Oxford	DR. EDGAR SCHUSTER, M.A.
University of St. Andrews	PROFESSOR EDGAR.
University of Sydney	PROFESSOR A. STUART, M.D.
University of Toronto	PROFESSOR R. WRIGHT.
Urban District of Finchley	COUNCILLOR ROYSTON.
The White Cross League	LIEUT.-COL. BOURNE.
Willesden Urban District Council	COUNCILLOR RILEY.
Women's Freedom League	MRS. CLARKE.

PAPERS.

PRESIDENTIAL ADDRESS.

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Thoughts suggestive of the general principle of evolution have been in the minds of many sages for many centuries. Not only have labourers in this field been found in all countries, but this great problem has been attacked from many different sides. Descartes and Leibnitz advanced from the basis of the physical sciences; Harvey viewed it as a physiologist; Kant and Spencer as philosophers; Goethe as a poet, and Lamarck and Darwin as naturalists, or in that field of science where our present beliefs were most recently accepted. And the result of this long struggle for mental victory on the part of these and other great men was unquestionably the practically universal acceptance of the principle of evolution in all fields of knowledge in the nineteenth century. For this great international achievement that epoch will ever remain famous.

And what is this belief which is now so wide-spread? It is indeed one which is so simple and now so interwoven with all our thoughts that we are apt altogether to overlook its existence. A belief in evolution merely implies a belief that all changes which have taken place and which are taking place in this world are changes in which effects follow causes in accordance with unvarying laws. It is one of the consequences of our belief in this principle, rather than an example of the belief itself, that we regard the earth as we now see it—the rocks, hills, and valleys—as having been produced by the action through long ages of those same natural forces which we can still see and study in operation to-day; a field of science in which Lyell was the great evolutionary pioneer. As regards living beings, the belief that a knowledge of the changes going on before our eyes gives the key to what has taken place in the past has in like manner led to the general acceptance of the view that all animals and plants are the descendants of some primitive form or forms from which they have been produced by some slow process of change. And this is indeed what the public now generally mean by evolution; although its essential feature is in reality to be found in the creed that all objects, animate and inanimate, are subject to the reign of natural law. Savages when they hear thunder hold that it is due to the fortuitous intervention of the thunder god; and when we, on the other hand, connect it with the generation in the air of electricity by friction or other natural processes, we are in fact asserting our belief in this underlying principle. And such a belief we now unhesitatingly avow whatever may be our creeds concerning the ultimate governance of the universe. Certainly it is in this spirit that all questions of fact in every field of science are now being investigated, and this is what is meant by the general acceptance of the principle of evolution.

But if the essential idea of this principle is indeed so simple, wherein, it may be asked, does its importance lie? The great value of the belief that similar effects always follow similar causes lies in the fact that we are thus stimulated to endeavour to understand what has taken place in the past, and that the knowledge thus acquired gives us some power of looking into the future. Daily forecasts of the weather are now issued, and these forecasts will obviously become more and more trustworthy as our knowledge of the natural laws affecting the air and the skies become more and more perfect. If we had remained faithful to the creed of the savage as to the incalculable nature of storms, we should now have no faith in these forecasts; or, in other words, without a belief in evolution, meteorologists would never have been stimulated to make those scientific researches which have already so greatly increased our prophetic powers. And our present scientific creed is unquestionably acting in a similar way as regards the study of man and his social progress. Indeed it now seems obvious that in a changing world our powers of foretelling the future—that is of making any forecast concerning the results of the forces now at work—must entirely depend on our knowledge of the sequence of events in the past. It is for this reason that we are attaching greater and greater importance to the study of the natural laws regulating the sequence of human events; for without any such knowledge we should in this world be marching blindfold into an unknown future. And it will in time be recognised that it is by increasing our prophetic powers that a belief in evolution has conferred its greatest benefits on mankind.

In order to make our knowledge of the evolutionary process practically useful, it is, therefore, obviously of the first importance that we should know how and why succeeding generations of mankind have resembled or differed from each other. The questions thus suggested for consideration may be divided under two main headings. In the first place it is to be noted that individually we pass on our learning and our thoughts to our juniors and our successors by writing and by word of mouth, whilst the material wealth of the nation in the form of improved surroundings is in a perpetual state of transference as time goes on. In other words the environment of one generation is very largely dependent on the environment of the generations which preceeded it; and according as we are increasing or dissipating the mass of accumulated knowledge, as we are careful or careless in the expression of our thoughts, as we add to or diminish the wealth of the nation, so is our conduct tending to make the world progressive or retrograde in this respect. No one can deny the importance of external conditions to the morals, health and comfort of mankind; and our instincts, selfish and unselfish, may be trusted to ensure a large amount of attention being always devoted to the factor of environment in the evolutionary process.

There is, however, on the other hand another method by which each generation receives a heritage from its predecessors, and to which an adequate share of human thought has never as yet been given. With every increase in our scientific knowledge of the laws of life it becomes increasingly evident that the inborn qualities of the child are derived from its ancestors in accordance with laws which, though now but imperfectly known, are gradually but surely being brought to light. If the future is thus tied to the past in accordance with these laws of heredity, we must be entirely dependent on our knowledge concerning them when endeavouring to ascertain whether the inherent qualities of the individuals composing the coming generations will show an improvement or the reverse in comparison with our standards of to-day; and, when thus peering into the future, it is therefore evident that a mere study of the factors directly and immediately affecting our present environment, however important it may be, is wholly insufficient for our needs. There are, in fact, two great factors influencing us all through our lives, heredity and environment; and if at this Congress we are chiefly concerned with the former—that is with nature rather than with nurture—it must not be assumed that little importance is attached by us to the many endeavours now being made to improve the environment of the people, an object unquestionably greatly worth striving for. If we choose natural inheritance as the field for our operations, it is partly because it is not wise to attempt to cover too much ground on one occasion, and partly because this branch of enquiry into human affairs, being surrounded with many difficulties and having been much neglected in the past, seems now to be the one most in need of our efforts. Then again, not only are the careers of all men largely influenced by their inborn qualities, but the surroundings which each man steps into at his birth undoubtedly in large measure depend—indeed in so far as they are under human control perhaps wholly depend—on the inborn qualities of those of their ancestors and predecessors who were instrumental in moulding that environment. Thus any steps which we may now take tending to improve the racial characteristics of the generations of the immediate future will undoubtedly benefit the countless millions of the more distant future as regards the heritage they will receive at birth in the form, not only of inborn qualities, but also of improved surroundings. To endeavour both to study the laws of heredity and practically to apply the knowledge thus acquired to the regulation of our lives, seems, therefore, to be a paramount duty which we owe to posterity.

But when we embark on such a comprehensive study of life as is here suggested, it soon becomes apparent that the history of the world is not a tale of a continuous and uninterrupted advance. Nature seems to have been making innumerable experiments, of which many proved to be failures. New species have often arisen in the long by-gone ages merely, it would seem, to become extinct and to leave no living traces behind them. New

civilisations have arisen from time to time and have then died away, leaving the world little or no better for the progress thus temporarily made. It is true no doubt that, if we take a wide enough field of view, it does appear that the world has always been slowly advancing towards a better state of things, and the teachings of science need not shake the faith that some of us hold, that this advance is destined to continue in the future. But if we confine our view within a narrower horizon, and if we look merely at our own form of civilisation, the history of the past affords us no right whatever to prophecy a continued improvement in the lot of our race in the immediate future—no, not even the right to deny the possibility of the decadence of any nation. In fact, pride in our past achievements must not make us turn a deaf ear to the warnings which come from a study of the laws of heredity. Indeed many circumstances brought to light in recent investigations ought to force us to consider whether the progress of western civilisation is not now at a standstill, and, indeed, whether we are not in danger of an actual retrograde movement

No doubt we are ignorant in many respects concerning the laws under which evolution has been operative in the past. We are especially ignorant about the final causes of variations in animals and plants, and also about the effects produced by environment on the racial qualities of future generations; and there may therefore be forces now at work making for racial progress or decay of which we know nothing. There is, however, certainly one agency which has had a great influence in the past and of which much is now known, and that is natural selection, or Nature playing the part of the breeder of cattle in refusing to breed from inferior stocks. This progressive agency, by continually weeding out the unfit, has always tended to make living beings more and more able to seize the opportunities offered to them by their environments. And it seems as if this forward movement had gone on during all the long ages since life first appeared on earth until recent times, when by our social methods we have been doing our best to prevent further progress being made by this same means. The unfit amongst men are now no longer necessarily killed off by hunger and disease, but are cherished with care, thus being enabled to reproduce their kind, however bad that kind may be. It is true that we cannot but glory in this saving of suffering; for the spirit which leads to the protection of the weak and afflicted is of all things that which is the best worth preserving on earth; and we can therefore never voluntarily go back to the crude methods of natural selection. But we must not blind ourselves to the danger of interfering with Nature's ways, and we must proclaim aloud that to give ourselves the satisfaction of succouring our neighbours in distress without at the same time considering the effects likely to be produced by our charity on future generations is, to say the least, but weakness and folly.

The filling up of the blanks in our knowledge of the laws of life ought undoubtedly always to stand in the forefront of our programme. But our ignorance certainly does not forbid us to enquire whether our present knowledge is not sufficient to enable some steps to be taken with the view of safeguarding the race from the evil effects likely to be felt in the future as the results of our existing social policy. Certainly Sir Francis Galton, whose name we hope will ever in future be associated with the science of Eugenics, a science to which he devoted the best years of his long life, declared with no uncertain voice that something should be attempted without further delay. The necessity for some action now being taken can, indeed, no longer be denied on account of the absence of witnesses, non-scientific as well as scientific, in its favour. If we tell the breeders of cattle that their knowledge of the laws of heredity is so imperfect that it is useless for them either to attempt to avoid breeding from their worst stocks or to try only to breed from their best stocks, why they would simply laugh at us; and the number of those who now see matters as regards mankind in the same light is steadily increasing. No doubt the paramount necessity of maintaining a moral code introduces vast difficulties in the case of man which are unknown in the stock yard, and unquestionably the possibilities open to us are thus greatly limited. No doubt also our ignorance imperatively commands us to be cautious in our advance. But stagnation is to be feared as well as error; and when we see good reason to believe that some step could now be taken tending to benefit future generations, both as regards their minds and their bodies, our fears must not be allowed to stand too much in the way of our actions.

It must, however, be remembered that it is not sufficient to satisfy the students of biology and sociology in order to ensure the adoption of the needed reforms; for the knowledge which has convinced experts must be widely disseminated before it can produce this result. Again to adopt the analogy of the weather, the knowledge of the meteorologist, even if it should make him a perfect prophet, would be useless for practical purposes if his forecasts merely remained on record in his laboratory for his own edification. The elaborate system of telegraphing the weather forecasts all over the country is essential if the sailor and the farmer are to have any chance of utilizing them practically. In the same way, our knowledge of the laws of heredity, however perfect it may become, will continue to be of comparatively little use as a method of ensuring the progress of mankind until it is not only widely known but actually incorporated in the moral code of the people. The man of science is right in regarding truth as a mistress to be sought for her own sake only, for in that way, certainly, she is most likely to be captured. But it must not be forgotten that the results of the labours of many sages during many centuries will continue to be of no value to mankind in general so

long as evolution is merely regarded as a principle by which to interpret the past. We must have a bridge to unite the domain of science with the domain of human action, and such a bridge forms an essential part of the structure of Eugenics. Both national societies and international co-operation are needed for the purpose of spreading the light, and the efforts already made in these directions will, it is hoped, be furthered by the holding of this Congress.

We may thus conclude that though for the moment the most crying need as regards heredity is for more knowledge, yet we must look forward to a time when the difficulties to be encountered will be moral rather than intellectual; and against moral reform the demons of ignorance, prejudice and fear are certain to raise their heads. But the end we have in view, an improvement in the racial qualities of future generations, is noble enough to give us courage for the fight. Our first effort must be to establish such a moral code as will ensure that the welfare of the unborn shall be held in view in connection with all questions concerning both the marriage of the individual and the organisation of the state. As an agency making for progress, conscious selection must replace the blind forces of natural selection; and men must utilize all the knowledge acquired by studying the process of evolution in the past in order to promote moral and physical progress in the future. The nation which first takes this great work thoroughly in hand will surely not only win in all matters of international competition, but will be given a place of honour in the history of the world. And the more nations there are who set out on this path, the more chance there is that some one of them will run this course to the end. The struggle may be long and the disappointments may be many. But we have seen how the long fight against ignorance ended with the triumphant acceptance of the principle of evolution in the nineteenth century. Eugenics is but the practical application of that principle, and may we not hope that the twentieth century will, in like manner, be known in future as the century when the Eugenic ideal was accepted as part of the creed of civilisation? It is with the object of ensuring the realisation of this hope that this Congress is assembled here to-day.

Section I.

Biology and Eugenics.

VARIAZIONE E EDEREDITÀ NELL'UOMO.

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Questi sono due problemi fra loro connessi per i quali i naturalisti hanno fatto il loro maggiore sforzo per risolverli, ma sinora, data la grande complessità dei caratteri che si comprendono negli esseri viventi, essi non hanno avuto una soluzione completa. Anche i metodi impiegati per la ricerca dei fatti e per la loro interpretazione, sono vari e ancora spesso tra loro discordi.

Variabilità e variazioni, ereditarietà ed eredità dei caratteri sono idee ed espressioni tra loro legate intimamente. I fenomeni dell'eredità senza le difficoltà che presenta la ereditarietà di alcuni caratteri, la variazione senza la variabilità multiforme di tali caratteri, forse avrebbero una spiegazione più facilmente investigabile, e troverebbero un metodo o una dottrina più semplici per la loro constatazione e la loro origine. Se poi ci fermassimo alla superficie dei fatti, come immediatamente appariscono all'osservatore, senza penetrazione dei processi interiori, troveremmo, come già si é creduto di trovare, facilmente la spiegazione.

Uno scoglio non evitabile nello studio delle variazioni è quello delle cause che le determinano: sono energie esteriori che influiscono sui viventi a farli variare, ovvero sono condizioni interiori dello stesso organismo vivente, che determinano la sua variabilità? E vi sono partigiani esclusivi dell'uno e dell'altro concetto. Nè basta: le variazioni che subiscono i viventi sono esse di una sola natura o di natura varia? e si trasmettono tutte egualmente, qualunque sia la loro natura, o soltanto alcune? Il naturalista sa, da qualche tempo, da Lamarck a Darwin, da Galton a Weissman, quello che si è scritto e sostenuto sui caratteri acquisiti, e sa anche quanti altri lavorano su questo problema. Ma qui sarebbe fuori luogo farne la storia.

Non è nostro intendimento di occuparci quì delle teorie e di definire i problemi delle variazioni e dell'eredità; vogliamo soltanto esporre alcuni fatti che rispondono ai due problemi riguardo all'uomo, e manifestare il nostro giudizio intorno ad essi, quando occorre

Uno dei problemi più dibattuti in antropologia è quello che riguarda le forme del cranio umano relativamente alla loro persistenza o variabilità. È bene premettere che noi abbiamo stabilito l'esistenza di forme primarie secondo la struttura morfologica del cranio umano non secondo la craniometria convenzionale, cioè: dolicomorfo e brachimorfo. L'uno e

l'altro divergono nella relazione della lunghezza con la larghezza e si approssimano alle categorie stabilite dalla craniometria senza identificarsi. Il dolicomorfo comprende il cranio lungo per strutture e le due categorie di dolico e mesocefalia, ma anche può comprendere qualcuno dei brachicefali; il brachimorfo accetta tutti o la massima parte dei brachicefali e può anche comprendere crani mesocefali. Finora gli antropologi non ammettono questo fatto, perchè non tengono conto della morfologia del cranio umano, se non per mezzo dell'indice cefalico; da molto anni noi abbiamo dimostrato che la craniometria non corrisponde alla craniomorfia. Inoltre le due forme primarie si dividono in altre che noi abbiamo denominato varietà craniche, e quindi esistono varietà del cranio dolicomorfo e varietà del cranio brachimorfo. Negli ultimi anni l'analisi delle forme americane ci ha fatto trovare una nuova classe fra le due primarie, cioè la pecilomorfa o una forma che non può esser compresa in nessuna delle due precedenti.*

Premessi questi concetti per intenderci, veniamo al problema: sono i brachimorfi derivati dai dolicomorfi? Questo problema é stato posto da molti e da molto tempo, ma nessuno ha mai posto l'altro, cioè se il dolico possa derivare dal brachimorfo; forse perché si crede che il primo sia primitivo e il secondo soltanto derivato? O se ammettiamo la trasformazione di una forma in altra, come alcune hanno sostenuto, dobbiamo ammettere una grande variabilità, la quale se si potesse verificare, farebbe trasformare completamente questo segmento umano, cui giustamente si da tanta importanza nello studio dell'uomo. Il concetto di tale trasformazione agli antropologi è venuto dal fatto di aver trovato in alcune regioni una sostituzione del tipo brachimorfo sul dolicomorfo, e l'Europa é stata il campo di questa trasformazione che ha dato origine a questo concetto. Non sapendo o non volendo ricercare altrove l'origine delle forme brachimorfe, e non volendole considerare come immigrate, le hanno supposte come originate per trasformazione dell'altro tipo.

Ma manca la teoria e con essa la causa della supposta trasformazione; queste si ricercano speculando. La pianura o la montagna sarà la causa di questo fenomeno? ma questo non trova conforto dal fatto, perchè il brachimorfo occupa tutta la grande pianura della Russia e nel tempo stesso le altitudini delle Alpi, e così altrove. Cioè, occupa pianure e montagne indifferentemente. E forse il clima rigido o il mite? Neppure i fatti confermano la teoria. Gli Esquimesi, i popoli più artici, sono squisitamente dolico, mentre i Samoiedi alla cornice settentrionale asiatica, i Lapponi all'estremità nordica di Europa sono brachimorfi, come gli Italiani del Po e molte popolazioni balcaniche. Sono usi e costumi di popoli che agiscono sui muscoli del capo a far trasformare la struttura cranica? Così vorrebbe Nystrom; ma analoghi o identici effetti dovrebbero trovarsi in popoli con

* Vedi nostre opere: Specie e varietà umane; Torino, 1900—L'Uomo secondo le origini, le variazioni, l'antichità, la distribuzione geografica; Torino, 1911.

identici costumi, e nulla di ciò avviene. Allora è l'abitato o, come dicesi, l'ambiente che fa trasformare il cranio; e Boas crede di aver dimostrato il fenomeno per i discendenti degli immigranti negli Stati Uniti d'America.

Contro questo preteso mutamento che sembra dimostrato da Boas con dati di fatto, io ho potuto far rilevare che esso è un puro effetto di illusioni dovuto al metodo statistico usato dall'Autore. Boas crede dimostrative le medie ottenute sulle misure craniche, facciali, e altre senza tener conto degli elementi da cui le medie derivano, che sono eterogenei. Si può facilmente dimostrare che tali medie irrazionali nei discendenti degli immigranti negli Stati Uniti di America non sono discordanti da quelle delle stesse popolazioni europee, dalle quali derivano gli emigranti; ed inoltre si può dimostrare che la composizione delle serie da cui si hanno le medie non è sostanzialmente diversa nei figli degli emigranti e nelle popolazioni europee dalle quali vengono gli emigranti. Sarebbe poi strano il fatto di mutamenti divergenti come ammette il Boas, cioè che gli ebrei brachicefali diventerebbero dolico, e i siciliani dolico diventerebbero brachi e in un abitato dove coesistono da epoche preistoriche forme dolico e brachicefale.*

Altri antropologi credono di trovare trasformazioni della forma cranica da dolico in brachimorfa e spiegarla per effetto di influenza della cultura, come se il cervello aumentasse di volume e si allargasse per una attività maggiore, la quale non si avesse avuto in tempi preistorici e in popolazioni nello stato primitivo. Anche quì sono fallaci i ragionamenti, e i fatti non sussidiano menomamente l'ipotesi o l'affermazione. I Samoiedi sono, come tutti sanno, brachimorfi e non possono dirsi popolazioni che han fatto aumentare la cultura o la civiltà in qualche direzione. Sono invece dolicomorfi i popoli del Mediterraneo, dagli Egiziani ai Greci ai Latini, meno le mescolanze di elementi eterogenei, e nessuno può affermare che si siano trasformati in brachimorfi per essere stati i civilizzatori dell'umanità. Nessun antropologo oggi affermerà che gli Scandinavi e gli Inglesi, nella massima parte dolicomorfi, non siano fra i popoli di grande cultura, e non si trasforma per questo il loro cervello con il loro cranio. Del resto, in altra occasione, ho potuto far rilevare che la capacità cranica non è aumentata con l'attività cerebrale nei popoli civili, perché i crani della Vezére esaminati da Broca hanno una capacità superiore ai crani parigini moderni e di altra parte della Francia. Ultimamente il cranio mousteriense Chapel-aux-Saints presentava una capacità superiore a 1600 cc., cioè in un cranio del tipo di Neandertal.

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* Vedi Boas, Changes in bodily form of Descendants of Immigrants. Washington; 1910—Id., Abstract of the Report of Changes, etc. Washington; 1911.

Sergi, Il preteso mutamento delle forme fisiche nei discendenti degli immigrati in Americá; Rivista di Sociologia, 1912.

Radosavljevich, Professor Boas' new theory of the form of the head; Amer. Anthropologist, Vol. 13, N. 3°.

Più strana è l'ipotesi di altri che possano ammettere una trasformazione per un isolamento momentaneo su montagne o altrove e anche in tempo breve, come sarebbe il periodo storico.

Queste e altre ipotesi analoghe derivano dal fatto di non sapere o di non concepire la penetrazione di elementi demografici nuovi in una popolazione, o la migrazione in piccola o grande scala in una regione abitata, e quindi la lenta o rapida sostituzione di un nuovo tipo etnico.

Davanti a tutte queste teorie ipotetiche, invece, esistono fatti bene e chiaramente stabiliti contro cui nulla vale, perché un fatto è valevole più di molte teorie, cioè la persistenza delle forme del cranio umano attraverso i tempi e in ogni regione, ed oltre a questo un altro fatto veramente importante, cui nessuno quasi ha badato, voglio dire che brachimorfia e dolicomorfia del cranio sono primitive. In Europa, dove le scoperte di paleontologia umana sono relativamente numerose, e le epoche attribuite ai documenti scoperti sono approssimativamente esatte nel calcolo cronologico della geologia, le due forme sono quasi contemporanee. Si rileva che il tipo de Neander ha i suoi dolico e i suoi brachimorfi nelle numerose ossa di Krapina, e che il ramo fossile che porta i caratteri dell'uomo recente ha i suoi crani dolico e brachicefali. Queste due forme sono probabilmente due rami di un tronco e null'altro si può sostenere, cioè l'origine comune e non la trasformazione di una forma nell'altra.

Di queste forme fossili, la neandertaloide è estinta in tutte e due i rami secondari, mentre l'altra non ha lasciato discendenti nel ramo brachimorfo, come in altro luogo ho dimostrato; soltanto il ramo dolicomorfo ha persistito dividendosi in forme varie, quelle forme, cioè, che noi abbiamo trovato dai periodi quaternari ai neolitici. I crani di Ipswich, di Galley Hill, di Clichy, di Tilbury, di Combe Capelle, di Cromagnon, di Mentone, di Predmost, dei Balzi Rossi, di Laugerie Basse, di Solutré, di Sorde, hanno tutti molti caratteri moderni con le identiche variazioni che si trovano già nei crani neolitici e nei loro discendenti.*

Se lo scheletro di Castenedolo è veramente del pliocene inferiore, come ora nuovamente sostengo, il cranio suo non si distingue da uno recente, nè pure il resto dello scheletro. Il Prof. Keith nello scheletro di Ipswich trova che alcuni caratteri non differiscono da quelli di un inglese recente. Ciascun vede quanta resistenza ha presentato questo tipo umano fin dal terziario, e basterebbe questo fatto a dichiarare fantastiche tutte le teorie moderne e tutte le strane ipotesi emesse intorno alla variabilità del cranio umano, quando questo ha già assunto una determinata forma; e non importa, se la ipotesi dell'evoluzione, come fino ad ora è stata concepita, ne soffra, perchè i fatti valgono più delle teorie, le quali, per avere valore, devono aver fondamento in quelli e non su speculazioni senza base.

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* Confronta per la dimostrazione nostra opera: *Europa*. V. Biblico grafia.

Un fenomeno di molta importanza altre volte da me stesso esplicato, e che serve a dimostrare la persistenza delle forme, è quello che deriva dalla mescolanza delle due forme caratteristiche, dolico e brachimorfe, nell'incrociamento umano. Sarebbe ad aspettarsi in questo caso, secondo alcuni, una forma intermedia, e qualche antropologo l'ha sostenuto, specialmente volendo esplicare quella mesocefalia, che è semplicemente convenzionale in craniometria. Altra volta ho dimostrato che la mesocefalia non costituisce una categoria morfologica, ma soltanto craniometrica; essa non è che una variazione, secondo la larghezza del cranio, del tipo dolicomorfo e s'incontra sempre, senza eccezione, con maggiore o minore frequenza, dove domina il tipo di forma lunga, vi siano o non vi siano incrociamenti con brachimorfi. Esistono regioni intere dove dominano dolico e mesocefali senza un brachicefalo.

Che una forma intermedia non esista come effetto di incrociamento è facilmente dimostrato dalla persistenza dell'uno e dell'altro tipo nello stesso luogo e nelle stesse famiglie incrociate. Vi è in questo caso quella segregazione nella discendenza, che si trova nell'eredità secondo la teoria mendeliana. Noi non abbiamo osservazioni dirette per controllare le generazioni e il numero delle forme nei discendenti, ove avviene la separazione; ma questo non infirma il fatto da me osservato molte volte di famiglie in cui i genitori avevano testa di forma differente e i discendenti separarsi cosi che alcuni ereditavano la forma paterna e altri la materna. Se così non fosse, non potrebbesi spiegare come in una popolazione si possano trovare costantemente i due tipi senza l'eliminazione di uno di loro, eccetto, forse, quando uno dei tipi si trovasse in assoluta minoranza: ciò che non è neppure facile a constatare, perchè noi abbiamo potuto vedere che nella popolazione piemontese, dove il predominio è dei brachimorfi, trovasi una frazione di dolicomorfi come 1 :4, così come nella popolazione lombarda e emiliana. Se l'incrociamento producesse forme intermedie, i due tipi scomparirebbero colà dove s'incontrano, e dopo molti secoli o millenni storici e di mescolanza di popoli, non si avrebbe che unica forma del cranio umano.

Questi fatti dichiarano quanto le osservazioni sui discendenti degli immigranti in America settentrionale e le conclusioni tratte da Boas sono inconsistenti, come sopra abbiamo veduto; e dichiarano altresì che nessuna influenza esteriore, compresa nell'abitato, possa alterare le forme del cranio umano nei caratteri fondamentali di struttura.

Malgrado questa conclusione generale, si può constatare che esistono variazioni innegabili nello stesso tipo, vale a dire nel dolico e nel brachimorfo, presi separatamente. Di fatti la nostra classificazione delle forme craniche dimostra questa variazione, e noi abbiamo denominato appunto varietà queste forme, che presentano nel tipo variazioni particolari. Così il nostro ellissoide non si può confondere con l'ovoide e col pentagonoide, varietà di tipo dolicomorfo, e così lo sferoide non si confonderà

con lo sfenoide e col platicefalo, variazioni del tipo brachimorfo. Ma queste variazioni hanno forme subordinate che costituiscono le sotto-varietà, vere forme reali rispetto alla varietà, che è la denominazione comune astratta di essa. Nè basta, oltre a tali forme stabili, che sono persistenti come si ricava da osservazioni su molte serie dai tempi neolitici ai recenti, esistono variazioni individuali che non oltrepassano la vita di un'esistenza umana, perchè i caratteri, in questo caso, sono, come dicesi, fluttuanti e non fissi, senza che però portino nessuna variazione del tipo cui si riferiscono.

In questi confini, quindi, il cranio umano è stato molto variabile e sin d'origine, si può affermare, perchè variazioni come quelle osservate nei crani neolitici e recenti si vedono nei pochi fossili conosciuti e di cui ho parlato. Ma in questo due altri fatti bisogna segnalare, che alcune forme o variazioni del tipo sono antichissime e tendono a sparire; una di queste è l'ellissoide pelasgico, forma lunghissima con lati paralleli, relativamente elevata, visibile nel piu antico cranio quaternario di Galley-Hill. L'altro fatto è che lo stesso tipo non varia egualmente nelle differenti varietà umane.

Le obbiezioni che sogliono farsi ai fatti esposti sopra sulla persistenza tipica delle forme craniche e sulla loro variabilità nei limiti dei due tipi, non possono avere alcun valore, perchè sono obbiezioni in astratto, e non si riferiscono a determinazioni di fatti osservati e osservabili, e perchè sono effetto di teorie sulle origini delle forme non mai controllate dai fatti.

In quanto ai caratteri esterni tegumentari con le appendici, colorazione della pelle, dei capelli e delle iridi, e forme dei capelli e degli occhi, possiamo affermare in modo categorico, che oggi essi sono egualmente stabili come i caratteri scheletrici. La loro formazione e la loro origine sfuggono alle ricerche odierne, ma devono essere così primordiali come la formazione delle varietà umane sotto varie influenze, sopratutto geografiche e locali e da tempo immemorabile. Queste caratteri resistono ora ad ogni altra influenza differente da quella che ha contribuito a costituirli, e quindi non manifestano variazioni ma invece conservano un'ereditarietà costante.

Soltanto negli incrociamenti i caratteri esterni subiscono alterazioni, come è facile constatare nei mulatti per l'unione dei negri con bianchi o con altre varietà di colore. Studi, ricerche, inchieste si sono fatte per accertare, se i caratteri, che del resto sono derivati da molti fattori, si comportano secondo l'eredità mendeliana, o non la seguono. Ed abbiamo in questo campo lavori di Mendelisti, come Bateson, Davenport, Hurst, e lavori di Biometristi, come Pearson e altri; gli uni in contrasto con gli altri. Ma gli stessi sostenitori dell'eredità mendeliana, come Bateson e Doncaster, ammettono che sono necessarie nuove osservazioni e rigorose per potere stabilire con sicurezza che l'eredità umana proceda secondo il concetto di Mendel, perchè si oppongono ancora fatti che sono dipendenti da molti fattori e da varie condizioni, per poter decidere della natura ereditaria loro, come si è praticato in molti animali e in molte piante. Stando però al concetto generale, se l'eredità mendeliana si verificasse costantemente nel

regno animale, non vi sarebbe nessun motivo che essa non trovasse applicazione nell'uomo. Doncaster a questo, proposito crede di poter scrivere che " In this respect crosses between different races of mankind resemble hybrids between different species of animals and plants, except that there is usually no sterility." Il che, per un certo rispetto, non è esatto, non essendo sempre fecondo indefinitamente l'incrocio umano, come comunemente si crede. Del resto, che l'eredità mendeliana sia soltanto nell'incrocio delle varietà e non possa aversi per l'incrocio di specie, non può per ora affermarsi in modo assoluto. Esperimenti esistono di piante che accennano a dimostrare anche nell'incrocio di specie l'eredità mendeliana, e Bateson attende esperimenti ancora per una sicura affermazione nell'uno e nell'altro senso. Così anche per l'incrociamento umano siamo nella stessa aspettativa.

In ogni caso, per ora, è accertato il fatto di eredità in morbosità, in deformazioni organiche umane, come si può leggere in molti scrittori che ne trattano particolarmente. Se poi questa eredità assuma la forma mendeliana piena o incompleta, è una ricerca che qui non interessa molto, avendo essa un carattere e un valore esclusivamente teorici.

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VARIATION AND HEREDITY IN MAN.

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These are two problems connected with each other to the solution of which scientists have directed their greatest efforts, but up to the present owing to the great complexity of the characters which living organisms possess, a complete solution has not been reached. Moreover, the methods employed in seeking the facts and in interpreting them are various, and, indeed, often opposed to one another.

Variability and variations, inheritance and heredity of characters are ideas and expressions intimately associated with each other. The phenomena of heredity and variation, considered apart from the difficulties raised by the inheritance of certain characters and the multiform variability of such characters, would no doubt lend themselves to an explanation more easily discoverable, and would suggest a simpler method for their ascertainment and a simpler theory of their origin. If, then, we stopped at the surface of the facts, as they appear directly to the observer, and did not enquire into the inner processes, we should easily be able to account for them, as some believe they can already do.

In the study of variations one difficulty which cannot be avoided is the question of their determining causes: Is it that external forces influence living beings to make them vary, or is it that internal conditions of the same living organism determine its variability? Each idea has its separate supporters. Nor is this all. The variations which living organisms undergo—are they of one kind only or of various kinds? And are they transmitted equally whatever be their nature, or are only some of them transmitted? The scientist knows from the time of Lamarck to Darwin, and from Galton to Weissman, what has

been written and maintained on the subject of acquired characters, and knows also how many others are now labouring on this problem. But the history would be out of place here.

It is not our intention to occupy ourselves here with the theories or to define the problems of variation and heredity. We only wish to put forward certain facts which are concerned with these two problems in the case of man, and to state our own opinion about them where it seems desirable.

One of the most controverted problems in anthropology is that which deals with the form of the human skull in respect of its persistence or variability. Now, in the first place, we claim that we have established the existence of primary forms according to the morphological structure of the human skull, not according to conventional craniometry—*i.e.*, dolicomorphic and brachimorphic. These differ as regards the proportion of length to breadth, and approximate to the established categories of craniometry without becoming identified with them. The dolicomorphic type includes the skull long by structure and the two categories of dolicocephalic and mesocephalic, but can also include some of the brachicephalic. The brachimorphic type receives all or the greatest part of the brachicephalic, and can also include mesocephalic skulls. Hitherto anthropologists have not admitted this fact, because they do not take account of the morphology of the human skull except by means of the cephalic index. For many years we have been showing that craniometry does not correspond to craniomorphy. Besides, the two primary forms are divided into others which we have called cranial varieties, and hence there exist varieties of the dolicomorphic skull and varieties of the brachimorphic skull. In recent years an analysis of the American forms has led to the discovery of a new class between the two primary classes, *i.e.*, the pecilomorphic, or a form which cannot be included in either of the two earlier forms.*

With these conceptions to guide us we come to the problem—are the brachimorphic derived from the dolicomorphic? This problem has been put forward by many and for a long time, but no one has ever proposed the other problem, *i.e.*, can the dolicomorphic be derived from the brachimorphic, perhaps because it is believed that the first is primitive and the second only derived? Now, if we admit the evolution of one form into another, as some have maintained, we must admit a great variability, which, if it could be proved, would completely alter this portion of the human frame, to

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* See our works: Human Varieties and Species, Turin, 1900. Man, according to his origins, variations, antiquity, and geographical distribution, Turin, 1911.

* See Boas: Changes in bodily form of Descendants of Immigrants, Washington, 1910. Id. Abstract of the Report of Changes, etc., Washington, 1911.

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which so much importance is justly attached in the study of man. The conception of such an evolution has come to anthropologists from the fact of there having been observed in some regions a substitution of the brachimorphic type for the dolicomorphic, and Europe has been the field of the change, which has given rise to this idea. Not knowing or not wishing to seek elsewhere the origin of the brachimorphic forms, and not being willing to regard them as immigrant, they have considered them as originating by an evolution from the other type.

But the theory, and with it the cause of the supposed evolution are wanting—these they seek by speculating. Is the plain or the mountain the cause of this phenomenon? But this view does not find support in fact, because the brachimorphic occupies all the great plain of Russia and at the same time the heights of the Alps, and similarly elsewhere, *i.e.*, occupies plains and mountains indifferently. But, perhaps, it is a severe or a mild climate which is the cause? But the facts do not confirm this theory either. The Esquimaux, the most Arctic people, are completely dolico, while the Samoiedes at the northern corner of Asia, the Laplanders at the northern extremity of Europe are brachimorphic, like the Italians of the Po regions and many of the Balkan peoples. Is it the habits and the customs of peoples which act upon the muscles of the head and so transform the cranial structure? This is the opinion of Nystrom, but in that case analogous or identical effects should be found amongst peoples with the same customs, and nothing of that sort happens. Then, is it the surrounding circumstances, or as some say the environment, which transforms the skull? Boas believes that he has demonstrated the phenomenon among the immigrants in the United States of America.

Against this supposed change which seems demonstrated by Boas by statistics, I have been able to establish that it is a pure effect of illusions due to the statistical method employed by the author. Boas regards as demonstrative the averages obtained from the measurements—cranial, facial, and other—without taking account of the elements from which the averages are derived, which are heterogeneous. It can easily be demonstrated that such irrational averages amongst the descendants of the immigrants in the United States of America are not inconsistent with those of the same European populations from which the emigrants are derived; and, besides, it can be shown that the composition of the series from which the averages are obtained is not substantially different in the children of the emigrants and in the European populations from whom the emigrants come. It would be strange if changes occurred in opposite directions as Boas asserts; for instance, if brachicephalic Hebrews became dolicocephalic, and dolicocephalic Sicilians became brachicephalic, and this in a region where, since prehistoric times, the dolico and the brachicephalic forms have co-existed.

Other anthropologists believe that they can trace the evolution of the cranial form from dolico into brachimorphic, and explain it by the effect of

the influence of culture, as if the brain increased in volume and became enlarged by a greater activity which did not take place in prehistoric times and in primitive populations. Here, also, the reasoning is fallacious, and the facts do not in the least sustain the hypothesis or the assertion. The Samoiedes, as everyone knows, are brachimorphic, and cannot be called a race which have advanced civilisation or culture in any direction. On the other hand, leaving out of account the mixture of heterogeneous elements, the Mediterranean peoples, from the Egyptians to the Greeks and Romans, are dolicomorphic, and no one can affirm that they have been transformed into brachimorphic by having been the civilisers of humanity. No anthropologist to-day will assert that the Scandinavians and the English, who are for the most part dolicomorphic, are not among the races who have attained a high degree of civilisation, but this has not brought about a corresponding change in the shape of their brain and skull. Besides, on another occasion, I have been able to establish that the cranial capacity is not augmented with cerebral activity amongst civilised peoples, for the skulls of the Vezére, examined by Broca, have a larger capacity than the modern Parisian skulls and those of other parts of France. Finally, the Mousterian skull of Chapel-aux-Saints presented a capacity of over 1,600 c.c., *i.e.*, in a skull of the Neandertal type.

Still more strange is the hypothesis of those who think that a change of this nature can be effected by a temporary isolation in the mountains or elsewhere, and even in a short space of time as anything in the historic period would be.

These and other analogous hypotheses arise from the fact of not knowing or not conceiving the penetration of new demographic elements in a population, or the migration on a small or large scale in an inhabited region, and hence the slow or rapid substitution of a new ethnic type.

In face of all these hypothetical theories, on the other hand, there exist facts, well and clearly established, against which nothing avails, as one fact is worth many theories, *i.e.*, the persistence of the forms of the human skull through the ages and in all regions, and besides this another truly important fact which hardly any one has observed, I mean that brachimorphy and dolicomorphy of the skull are primitive. In Europe, where the discoveries of human palæontology are relatively numerous, and the epochs attributed to the discovered remains are approximately correct in the chronological calculation of geology, the two forms are almost contemporaneous. It is clear that the Neander type has its dolico and its brachimorphic types in the numerous bones of Krapina, and that the fossil branch which bears the characters of recent man has its dolico and brachicephalic skulls. These two forms are probably two branches of one trunk, and no other view can be sustained than the common origin and not the transformation of one type into another.

Of these two fossil forms the Neandertaloid is extinct in both its secondary branches, while the other has not left descendants in the brachimorphic branch, as I have shown in another place: only the dolicomorphic branch has persisted dividing into various forms, those forms, namely, which we have found from quaternary to neolithic times. The skulls of Ipswich, of Galley Hill, of Clichy, of Tilbury, of Combe Capelle, of Cromagnon, of Mentone, or Predmost, of the Balzi Rossi, of Laugerie Basse, of Solutré, of Sorde, have all many modern characters with precisely the same variations which are already found in the neolithic skulls and in their descendants.

If the skeleton of Castenedolo is really of the Lower Pliocene, as I now anew maintain, the skull cannot be distinguished from a recent one, nor can the rest of the skeleton. Professor Keith in the skeleton of Ipswich finds that some of the characters do not differ from those of an Englishman of recent date. Everyone sees what resistance this human type has presented from the Tertiary Period, and this fact would suffice to prove how fantastic are all the modern theories and all the strange hypotheses put forth regarding the variability of the human skull when this has already assumed a definite form; and it does not matter if the Evolutionary Theory, as it has been till now conceived, is affected, because facts are of more value than theories, which, in order to possess worth, must have their foundation in facts and not in baseless speculations.

A phenomenon of much importance again and again explained by myself, which serves to prove the persistence of forms, is that derived from the admixture of the two characteristic forms, dolico and brachimorphic, in human crossing. According to some, in this case we might expect an intermediate form, and a certain anthropologist has thus maintained, especially wishing to explain that mesocephalic type, which is simply a conventional one in craniometry. I have formerly shown that the mesocephalic type does not constitute a morphological, but only a craniometrical, type; it is only a variation, according to the width of the skull, of the dolicomorphic type, and is always met with invariably, with greater or less frequency, wherever the long type is dominant, whether there are or are not crossings with the brachimorphic type. There are entire regions where the dolico and mesocephalic types rule without a single brachicephalic specimen.

That an intermediate form does not exist as the result of crossing is easily shown from the persistence of one or the other type in the same place, or in the same intermixed families. In this case there is that segregation in the descendants which is found in Heredity, according to the Mendelian Theory. We have no direct observations verifying the generations and the number of forms amongst the descendants, where the separation takes place; but this does not invalidate the fact often observed by me of families in which the parents had heads of different forms, and the descendants are divided so that some inherited the paternal and others the maternal form.

If this were not so, it would be impossible to explain how in any one population two types could be constantly found without the elimination of one of them, except, perhaps, when one of the types is found in an absolute minority. That is, however, not easy to prove, because we have seen that in the Piedmontese population, where the predominant type is the brachimorphic, a fraction of dolicomorphics such as one to four is found, as also in the people of Lombardy and Emilia. If crossing produced intermediate forms the two types would disappear wherever they meet, and after many centuries or millenniums of history and of admixture of peoples there would be only one form of the human skull.

These facts show how inconsistent are the observations of Boas upon the descendants of the immigrants in America and the conclusions drawn from them, as we have seen above, and show on the other hand that no external influence forming part of the environment can alter the forms of the human skull in its fundamental characters of structure.

In spite of this general conclusion, it can be proved that undeniable variations exist in the same type, that is to say, in the dolico and brachimorphic taken separately. In fact, our classification of the cranial forms shows this variation, and we have named varieties those forms which present particular variations in the type. Thus, our ellipse cannot be confounded with the ovoid and with the pentagon varieties of the dolicomorphic type, and so the spheroid will not be confounded with the sphenoid or with the platicephaloid varieties of the brachimorphic type. But these varieties have subordinate forms which constitute the sub-varieties, true forms with respect to the variety, which is the common title abstracted from it. Nor is this all. Besides such enduring forms which are persistent, as can be shown from observations from many series from neolithic to recent times, there exist individual variations which do not endure beyond a human life, because the characters are, so to say, fluctuating and not fixed, without, however, yielding any variation of the type to which they belong.

Within these limits then it may be asserted that the human skull has been very variable, even from the earliest times, since variations such as those observed in neolithic and recent skulls are seen in the few fossils known to us, of which I have spoken. But in this connexion two other facts must be mentioned, that some forms or variations in type are very ancient and tend to disappear. (One of these is the Pelasgic ellipse, a very long form with parallel sides, relatively elevated, to be seen in the most ancient quaternary skull of Galley Hill.) The other fact is that the same type does not vary equally in the different human varieties.

The objections which are usually made to the facts expounded above upon the typical persistence of the cranial forms and upon their variability within the limits of the two types cannot possess any value, because they

are abstract objections, and are not based upon observed or observable facts, and because they are the effect of theories upon the origins of the forms which have never been verified by facts.

As regards the external tegumentary characters with their adjuncts, the colour of the skin, of the hair, and of the iris, and the characters of the hair and of the eyes, we can affirm categorically that to-day these are as fixed as the skeletal characters. Their formation and their origin elude modern investigations but must be as primordial as the formation of the human varieties under various influences, especially geographical and local, and of immemorial time. These characters now resist all other influence different from that which has contributed to produce them, and hence do not exhibit variations, but on the contrary preserve a fixed heredity.

Only in crossings the external characters undergo alterations, as is easily proved in mulattos by the union of negroes with whites or other varieties of colour. Studies, researches, inquiries have been made to determine if the characters which, after all, are derived from many factors behave according to the Mendelian heredity, or do not follow it. In this field we have the labours of Mendelians, such as Bateson, Davenport, Hurst, and the labours of the Biometricians, such as Pearson and others, the one class in opposition to the other. But the same supporters of the Mendelian heredity, such as Bateson and Doncaster, admit the necessity for new and rigorous observations in order to be able to prove decisively that human heredity proceeds according to Mendel's theory—for there are still opposing facts which depend on many factors and various conditions—in order to be able to decide about the hereditary nature of them in the same way as is done in the case of many animals and many plants. Taking one's stand, however, on the general theory, if Mendelian heredity is constantly verified in the animal kingdom, there should be no reason why it should not be found to apply in man. As to this question, Doncaster believes he can write that "In this respect crosses between different races of mankind resemble hybrids between different species of animals and plants, except that there is usually no sterility." He is not accurate in one respect, the crossing in the human race not being fertile indefinitely as is commonly believed. For the rest, that Mendelian heredity is found only in the crossing of varieties and cannot take place in the crossing of species, cannot at present be absolutely affirmed. Experiments exist of plants which tend to show Mendelian heredity also in the crossing of species, and Bateson awaits experiments for a safe affirmation in one or the other sense. So, also, as regards crossing in man, we are in the same expectant attitude.

In any case the fact of heredity in disease and in deformities of human organs is established, as may be read in the works of many writers who treat particularly of the subject. Whether this heredity assumes the Mendelian form, complete or incomplete, is an inquiry which does not much concern us here, inasmuch as it has an exclusively theoretical character and value.

ON THE INCREASE OF STATURE IN CERTAIN EUROPEAN POPULATIONS.

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If Eugenics is the study of agencies under social control that may improve or impair the racial qualities of future generations, either physically or mentally, it must be one of the first objects of Eugenics to take account of the agencies, under social control or not, that have already improved or impaired the racial qualities of the present generation. In many European populations the most obvious racial quality of all, the stature, has in the last fifty years or more undergone a very sensible improvement, having increased by as much as five centimetres, and even more. This improvement is generally ascribed simply to an improvement of the hygienic and economic conditions, but the question is intricate. The various populations are built up of a different number of racial elements, more or less well-defined, but always struggling for the supremacy. The social selection of individuals suitable for town life may have altered in many places the physical average of the rural population and veiled the increase, that has really taken place, exaggerating on the other side the real increase of stature in the towns. The rapidly falling death-rate has, beyond doubt, played a part, although it is rather difficult to point out in what way.

It is far from my intention to endeavour to give a complete scrutiny of the agencies that may have influenced the growth of man in this last half century. I only wish to call attention to the study of this most interesting question in presenting some old and new facts, partly from the literature and partly from my own studies. The inter-departmental Committee on physical deterioration, which brought together a vast amount of evidence concerning the physical condition of the present British people, did not succeed in elucidating the question of the increase in height. The Committee had only at disposal four cases in which a comparison between measurements from different periods was possible, and the result was contradictory, or at all events, uncertain. Only in one case was a real and undoubted increase of height established, the boys at Marlborough College, from 14 to 15 years old, having increased from 61.40 inches in 1874-78 to 61.96 inches in 1899-1902. This increase of 0.56 inches, or 1.42 centimetres in 25 years is by no means exceptional, but there are some reasons for believing that the improvement did not commence much before this period.

The final Report of the Anthropometric Committee appointed by the British Association for the Advancement of Science, in 1875, and submitting the Report in 1883, contains a table (XXIV.) showing the average stature and weight of factory children at an interval of 40 years, and another

table (XXV.) showing the average stature and weight of boys in the York Friends' School for 27 years, 1853-1879. An examination of the first of these tables indicates a slight but uniform increase in stature and a very large increase in weight at corresponding ages. In the second table the general run of the figures is very uniform, the statures remaining stationary, while there is a slight improvement in the weight of the higher ages in the last nine years of the period. The difference between the poor and badly nourished factory children and the York boys living under most favourable conditions (Quakers) is very considerable. At the commencement of the two periods the stature of the former group was at the corresponding ages from 3 to 5 inches and the weight from 12 to 20 pounds below that of the latter. It is evident, that the general improvement of the social and economic conditions of factory children, that had taken place just in this period, had been able to improve their physical condition far more than the slight change possible in the always favourable conditions of the York Quaker boys could do.

It is much to be regretted, that such material is exceedingly scarce in England, where the measurements of recruits for the army and navy are of doubtful value. In other countries the conscription lists contain a rich source of information on this subject, and leave no doubt about the general increase of the stature. In my own country the Danish Anthropological Committee finds, that the height of the fully grown Dane has in the course of the last 50 years undergone the following changes :—

1852-1856	...	...	...	165.42 cm.
1879-1888	...	...	...	167.78 cm.
1891-1900	...	...	...	168.43 cm.
1904-1905	...	...	...	169.11 cm.

The average height has thus gone up by 3.69 cm. and apparently the increase has been steady and even throughout the whole period. The adult Dane has increased in height by 0.07 cm. yearly.

In Sweden and Norway the increase is undoubtedly the same as in Denmark. The conscription lists in these countries show an increase of only about 2 centimetres from the middle of last century, but they do not contain the measurements of the undersized for the first periods. A corresponding increase in height may also be found in other countries. The average stature of the Dutch has increased from 165.5 cm. in 1866 to 167 in 1883 and 168 in 1899. The increase in the Netherlands seems to be still greater than in the Scandinavian countries, and is said to have been nearly 10 centimetres in the last 50 years. The Dutch anthropologist, *L. Bolk*, who has paid much attention to this subject, is inclined to believe, that this considerable increase is too great to be due only to the general improvement of the social and economic conditions of life. He supposes that the former low stature indicates a transitory state of deterioration and that the increase is to be regarded partly as a sign of recovery from this state. I believe

he is right, as it is clear that the increase cannot have continued in this way for a long time. The stature of North Europeans was in still earlier times certainly not much below that of the present day. Measurements of skeletons from prehistoric times have sufficiently proved, that the stature has not changed sensibly in the last two thousand years or more, although it may have oscillated periodically about a mean somewhat different in the various countries.

It is the agencies alternately improving or impairing the racial qualities of man which have to be studied, but this is not possible until we possess a thorough knowledge of the racial qualities, and such knowledge is still far away. We only need to ask whether the mean weight of the new-born child is increasing or not to see this. What is the mean weight of the new-born child? We do not know. For British infants Pearson gives the following averages:—

Male	...	...	...	7.301 + .024 lb.
Female	...	...	...	7.073 + .021 lb.

This statement is undoubtedly the most accurate available for the present time; compared with that of the Anthropometric Committee (Final Report, p. 33, and Table XV.) it indicates the considerable increase of 0.18 lb. for the male and 0.13 lb. for female infants or 82 and 59 grams respectively in about 20 years. These infants, however, are born in charitable institutions of London and Edinburgh, and belong on the whole to the poor, labouring class. Many of the mothers might have been brought up in the country, but we do not know whether the relation between the rural and urban portion is the same in the two periods or not. Still, it is a well-known fact that the later children of a mother are heavier than the first, the weight increasing by about 75 grams from birth to birth, and we do not know how many of the infants are first-born. Nor do we know if all the infants are really born at the full period of gestation, for it is very difficult to decide this question.

It is most probable that the average weight of new-born British infants has increased by about the amounts stated, 82 and 59 grams, and this improvement might be due to various agencies, partly to better nourishment, partly to a healthier mode of life during the period of gestation, but the influence of these various agencies has still to be ascertained. In Denmark the weight has been found to have increased by only 40 grams in 35 years, although the general improvement in the hygienic and economic conditions of the mothers has certainly not been less considerable during this period than in England. We are not quite sure, however, that the mothers of these children belong to the same social layer now as 35 years ago. It is not impossible that the inmates of the lying-in hospital are more frequently married women of the working class, and if that is the case, the relative number of first-born, less heavy infants, might have been reduced. All these difficulties sufficiently prove the necessity of collecting still further

and better material and of scrutinizing this material critically. The study of the body form and size of man must begin at birth and continue throughout the whole life. Best known nowadays are the bodily conditions of school children, which have been studied in recent years in all civilised countries. A series of measurements made 25 years ago in some Danish country schools has enabled us to determine the increase of stature and chest girth in precisely the same districts and the same social layers. The average stature of sons of cottagers has in this period increased by 0.7 cm., that of the daughters by 2 cm., while the stature of sons of farmers has decreased by 0.7 c.m., and that of the daughters increased by 0.5 cm. The average chest measurement of sons of cottagers has increased by 2.9 cm., and that of sons of farmers by 3.4 cm. In Denmark we are continuing these investigations on a large scale and the Anthropological Committee has already brought together measurements of many thousands of children and adult persons at all ages and of both sexes. Material of an earlier date is scarce in Denmark as everywhere; we are in possession, however, of several valuable collections and are in search of more.

It is permissible to believe that the increase of stature during the school age is a great deal due to the progress of school hygiene. The development of all kinds of bodily exercise that has taken place in the last decades must have had a considerable influence on the growth of the children. The extensive investigations carried on in America and elsewhere seem to prove that this is really the case, but such investigations must be continued. The materials for studying the agencies that may improve the racial qualities are here easily available.

Far more difficult is the task of procuring reliable and sufficient measurements of full-grown persons. The scrutiny of the conscription lists has taught us much about the bodily development of young men, but we know nothing, or at all events very little, about the average stature and weight of advanced age. The statistical data of the life insurance societies show that the averages are considerably higher in the later age-classes, but here a selection has taken place. The material does not contain the rejected and it is to be supposed that insured persons are, on the whole, higher and heavier than the uninsured. This subject is, however, very intricate. The very tall and very heavy are probably to be found among the uninsured, for the societies are generally suspicious about them.

Information is very scarce regarding the difference between the stature of adult women in earlier times and now. In France the average stature of adult women is said to have increased from 154 to 157 cm., or by 3 cm. in the last 80 years, and it very probably has done so. There is a considerable difference, however, between the average stature in the various parts of the country, and as the total number of measurements in the last period is only 255, the statement is not convincing.

It is a great defect in many of these investigations that the numbers are too small, and it is a serious error, when small numbers are taken as sufficiently great to be treated by subtle mathematical methods. The ethnical diversities in a large country such as France are so great that the French people will never be truly represented by two or three hundred persons. Nor is it of very great interest that the average stature of the British is stated to be 1,720 mm., when that of the Scotch is 1,725, the Irish 1,713, the English 1,706, and the Welsh 1,691 mm.

The only way to attain to full and reliable knowledge regarding all these things is, however, a methodical anthropometric survey established and conducted by the governments. Private scientists have already laid the foundation, but they cannot reach much farther without governmental aid. It is not easily understood why the governments hesitate. There is no lack of exhortation. I need only recall the first of the principal recommendations, which the inter-departmental Committee on physical deterioration put forward. It runs as follows: " With a view to the collecting of definite data bearing upon the physical condition of the population the Committee think that a permanent Anthropometric Survey should be organized as speedily as possible upon the lines indicated in Part I. of the Report. In the first instance this Survey should have for its object the periodic taking of measurements of children and young persons in schools and factories, enlisting for this purpose the assistance among others of school teachers and factory surgeons, supplemented by a small staff of professional surveyors. Besides this a more comprehensive and specialist survey spread over a longer period of the population of the country at large might be undertaken." This appeal to the British Government from a most authoritative body has, I understand, not yet been fruitful, the reason being, I am inclined to suppose, that the plan proposed seems rather costly. I believe that it may prove more costly in the end to neglect the exhortation.

LE COSIDETTE LEGGI DELL'EREDITARIETÁ NELL'UOMO.(*)

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Il Morselli a più riprese accenna, nella sua grande opera *Antropologia generale* testè compiuta, alla possibilità che le leggi mendeliane abbiano una verifica nell'Uomo. Grazie alle ultime ricerche, compiute principalmente agli Stati Uniti e in Inghilterra, si ha oramai la certezza che le razze umane si comportano esattamente come le altre razze animali. Per bene intendere tali ricerche è però opportuno riferirsi alle classiche esperienze del Cuénot sui topi, le quali occorre riferire brevemente.

Ogni razza, sia una subspecie che una varietà—gli zoologi adoperano questi tre vocaboli senza tante sottigliezze verbalistiche—ha un patrimonio ereditario di certi caratteri, patrimonio che viene trasmesso integralmente ai discendenti, nei quali sinchè si mantiene lo stesso plasma germinativo che nei progenitori, si ha lo stesso *biotipo* (Johannsen). Il Cuénot(1) ha studiato come si comporta il plasma germinativo del topo grigio, che si può considerare come l'antenato comune delle altre forme o razze o varietà di *Mus musculus*. Esso contiene un certo numero di *determinanti* (non nel senso del Weismann) o unità ereditarie o *geni*, ciascuno dei quali è suscettibile di cambiamenti o mutazioni. Nel tipo ancestrale vi sono almeno sei sorta o categorie di determinanti, che si possono designare convenzionalmente con le lettere C G F M U R. Se uno qualunque di questi determinanti è modificato si ottiene un'altra forma elementare di topo o *genotipo*, che differisce in qualche cosa dall'antenato, che ne è una *mutazione* (non nel senso del De Vries), forte o debole. Le diverse categorie di determinanti hanno presentato, nel corso del tempo, un numero variabile di mutazioni, una, due o più. Effettivamente sono accertate 9 mutazioni dei determinanti originari del topo grigio, quindi in tutto 15 determinanti di altrettanti caratteri: di questi caratteri alcuni sono *dominanti*, altri *dominati* o *recessivi* o *latenti*. Nello specchietto complessivo, che qui riproduciamo, i dominanti occupano la prima fila, e cosi successivamente gli altri per ordine di dominanza: le lettere mainuscole indicano i determinanti del topo grigio, che quasi tutti, tranne uno, sono nella prima fila, vale a dire dominanti.

(*) Dal primo Capitolo del libro *Homo sapiens,* di prossima pubblicazione.

(1) L. Cuénot. *La genèse des espèces animales.* Paris, 1911, p. 114; e altri lavori dello stesso A.

1	2	3	4	5	6
C a	j g' G n	F d	M x e	U p	R w

Perchè un tipo sia vitale, vale a dire sia un biotipo, occorre che esso abbia le 6 categorie differenti di determinanti, ma ciascuna categoria può essere rappresentata da uno qualunque dei determinanti che sono assegnati ad essa. Diguisachè possono aversi teoricamente 192 combinazioni differenti, genotipi, o *forme* di topo aventi una formula ereditaria propria; come potrebbero aversi altrettante combinazioni per l'Uomo, se anche in questo fossero disponibili 15 determinanti suddivisi in 6 categorie indispensabili. La molteplicità delle razze umane non è perciò un'eresia zoologica.

Abbiamo detto che alcuni di questi determinanti sono dominanti e altri dominati o latenti, conforme la dottrina stabilita dalle esperienze del Mendel, fatte sin dal 1860. Questa alternativa si verifica, negli incroci, quando i due individui, che vogliamo incrociare, presentano due diversi determinanti di una medesima categoria: allora nella discendenza si vede subito quale di questi due determinanti è il dominante. Per es., incrociando il topo grigio e il bianco, tutti i prodotti sono assolutamente identici di aspetto al grigio: allora si conclude che il determinante del carattere grigio è dominante sul bianco, poichè, dove vi è dominanza, si verifica la *prima regola di Mendel* (1), cioè *l'uniformità della* F_1 (secondo la terminologia del Bateson), vale a dire della prima filiazione bastarda.

Ma il carattere bianco è latente in questi topi grigi della prima ibridazione; poichè, mentre i loro progenitori erano *omozigoti*, o tipi puri, essi sono invece eterozigoti, il loro patrimonio ereditario è misto di due unità alternative, che sono gli *allelomorfi* del Bateson(2), vale a dire di due potenzialità antagonistiche. Una sola di queste potenzialità si palesa esteriormente, ma i due determinanti (come tutti gli altri della formula ereditaria) sono passati in tutte le cellule del loro corpo, comprese le cellule sessuali, e quivi si separano l'uno dall'altro, ciò che si chiama disgiunzione o *separazione dei determinanti* e costituisce la *seconda regola di Mendel* che riguarda la F_2, in modo che una metà dei gameti (uova o spermi) riceve il determinante del carattere grigio, e l'altra metà il determinante del carattere bianco, secondo la *ipotesi della purezza dei gameti*. Allora incrociando fra

(1) Si denomina anche *legge della dominanza*. Queste cosidette leggi di Mendel sono più esattamente da chiamare "regole" cfr. V. Haecker, *Allgemeine Vererbungslehre*, Braunschweig, 1911, p. 11.

(2) W. Bateson, *Mendel's Principles of Heredity*. Cambridge, 1909.

di loro questi topi grigi eterozigoti, si hanno quattro possibilità nei prodotti: una delle quali è quella di avere il gameto maschile e il femminile con lo stesso determinante bianco, perciò lo zigoto (cioè l'uovo fecondato) è omogeneo per tale carattere e l'individuo che ne risulta è omozigoto, com'è omozigoto nell'altra possibilità del gameto maschile e del femminile con lo stesso determinante grigio; una metà dei prodotti è invece eterozigota, ma tuttavia grigia, essendo questo il carattere dominante, mentre il carattere bianco è latente.

Si ha così che: se incrociano fra loro topi grigi omozigoti, tutti i prodotti sono grigi (e naturalmente omozigoti come i progenitori); se s'incrociano invece topi grigi eterozigoti, si ha il 25% di topi bianchi fra i prodotti.

Se uno dei grigi eterozigoti viene incrociato con un bianco, siccome quest 'ultimo non ha che gameti a determinante bianco, e il primo ha invece i due determinanti antagonistici (il grigio e il bianco), così si hanno due possibilità: o il grigio incontra il bianco, o il bianco incontra il bianco, nel primo caso si ha un topo grigio (eterozigoto), nel secondo un topo bianco. Vale a dire che *la metà* dei prodotti è bianca.

Le successive generazioni si comportano allo stesso modo; cosicchè, riassumendo: il bianco come carattere dominato, è sempre omozigoto, dal momento che non può essere palese se non quando il suo antagonista dominante, cioè il grigio, manchi completamente tanto nelle cellule somatiche che nelle germinali.

In molti altri animali albini sono state rincontrate le stesse regole, le quali si verificherebbero altresì negli albini umani, poichè i Davenport hanno potuto verificare che *due genitori albini non hanno che figli albini*(1). Ancora più importante è il fatto verificato dagli stessi Gertrude e Carlo Davenport, che *se uno solo dei genitori è albino il 50% dei figli sono albini*. Ciò vuol dire che l'altro genitore, sebbene normalmente pigmentato, si comporta come il topo grigio eterozigoto, cioè col carattere dell'albinismo latente. È questa appunto la spiegazione data dai Davenport. La quale implicitamente vale anche per gli albini nati da genitori entrambi pigmentati, cioè che ambedue questi genitori dovevano avere recessivo il carattere dell'albinismo: in tal caso non può apparire che una volta in quattro figli, secondo quella regola del 25% che abbiamo visto per i prodotti di due topi grigi eterozigoti.

I Davenport nella loro estesissima inchiesta hanno avuto invece il 34%, ma ciò è da loro spiegato adducendo che agl'informatori più facilmente accade di omettere qualche figlio normale, anzichè l'abnorme, il quale è appunto oggetto speciale dell'informazione. Si potè anche accertare che il

(1) G. C. e C. B. Davenport, *Heredity of Skin Pigment in Man*. American Naturalist XLIV. (1910), Nov.-Dec., p. 727.

33% di queste medesime famiglie presentava consanguineità dei genitori, onde si spiega che il carattere latente, cioè l'albinismo, derivava ad essi da un comune antenato; e così è probabile in molti altri casi, se si considera che ciò potrebbe avvenire anche fra cugini di un grado remotissimo, i quali naturalmente ignorano la loro parentela.

La qualità recessiva dell'albinismo e il suo comportamento mendeliano sembrano quindi ben stabiliti, nonostante le critiche matematiche del Pearson, le quali tralasciamo, avendo ad esse risposto gli stessi Davenport.

Senza volere entrare in particolari, merita tuttavia speciale menzione una famiglia di mulatti della Luisiana con albinismo parziale ereditario, stata studiata in Italia dal Frassetto e dal Levi(1). L'albero genealogico mostra diverse generazioni, ciascuna delle quali presentava uno dei genitori albino. Ma una di queste generazioni è particolarmente interessante per il grande numero di figli che si ebbe da unica coppia, cioè 15 dei quali 8 albini: la percentuale dell'albinismo è vicinissima al 50%, com'era previsto della teoria, ammesso che il genitore normalmente pigmentato abbia avuto il carattere albino recessivo, secondo la formula ($d\ r \times r\ r$), in cui d = dominante, r = recessivo o remissivo. Nella generazione successiva i discendenti sono ancora scarsi (e anche il loro numero è diverso secondo i due autori), e il loro comportamente indurrebbe—se non fosse troppo presto—a negare che si verifichi la regola di Mendel.

Invece, se il genitore normalmente pigmentato non ha recessivo il carattere dell'albinismo, il comportamento è diverso; cioè, alla prima generazione nessuno dei figli deve presentare l'albinismo palese. Il caso di Farabee(2) è bellissimo in proposito. Un albino negro sposato a una negra ebbe tre figli normalmente pigmentati. Ma l'albinismo latente si manifestò alla seconda generazione, esattamente come abbiamo visto per i topi albini. Poichè uno dei tre figli ebbe da due negre 15 figli, dei quali 4 albini, il che corrisponde precisamente alla divisione dei determinanti, restando il carattere recessivo isolato (e quindi palese) ogni 4 figli. Il comportamento dimostra che anche alla seconda generazione il carattere dell'albinismo era (recessivo) soltanto in uno dei genitori; altrimenti si sarebbe avuta la proporzione del 50% come nel caso Frassetto—Levi. Evidentemente famiglie con pochi figli sono molto meno dimostrative.

Per regola generale, quando una generazione viene saltata, come nel caso riferito, vuol dire che il carattere è recessivo. Sembrerebbe che anche il

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(1) E. Levi, *Albinismo parziale eredo-famigliare in Negri della Luisiana.* Arch. per l'Antrop. e l'Etnol XXXIX. (1909), fasc. 1; F. Frassetto, *Casi di albinismo parziale ereditario nella famiglia Anderson della Luisiana.* Atti Soc. Rom. di Antrop. XV. (1910), fasc. 2.

(2) W. C. Farabee, *Notes on a Negro Albinism.* Science, New Series, XVII. (1903), Jan.-June.

rutilismo (capelli rossi) sia in tale condizione, poichè il Frédéric riferisce di un tedesco meridionale a capelli rossi, il quale aveva due sorelle a capelli bruni, entrambi i genitori ugualmente bruni, mentre una nonna era a capelli rossi.

Tuttavia il Frédéric con molta circospezione lascia *in suspenso* la questione del mendelismo sia per il rutilismo che per l'albinismo, pur facendo notare la grande importanza che per quest'ultimo ha la consanguineità; non per il fatto che i due genitori siano imparentati, ma perchè contengono la stessa speciale disposizione recessiva, la quale porta all'apparizione della corrispondente anomalia, come si verificherebbe altresi per tante disposizioni morbose(1).

Anche lo Haecker(2) sostiene che l'albinismo specialmente nel Negro sia un carattere recessivo, e cita il bel caso di Farabee, essendogli ignoto quello osservato in Italia.

Più importante per l'antropologia è la pigmentazione normale, bruna o chiara, tipo bruno o tipo biondo, come si dice comunemente. I vecchi antropologi hanno ritenuto che il biondo sia semplicemente uno scolorimento del bruno, come se si trattasse di un abito o di un liquido colorato, che col tempo perde gradatamente la sua tinta. Ciò non è più sostenibile: con la nuova dottrina si vede chiaro che non vi è posto per un solo carattere più o meno attenuato, ma che si tratta di due caratteri nettamente determinati sin dai progenitori.

Risulta delle belle ricerche dei Davenport, che un totale di 115 famiglie, in cui entrambi i genitori erano biondi, ebbero 513 figli, dei quali soltanto 1.75% erano bruni, il che per differenti motivi è trascurabile, così da poter autorizzare la regola che *genitori biondi non hanno che figli biondi.* Ciò si ha perchè la mutazione bionda si comporta come l'albina: essa è recessiva rispetto alla bruna, onde i biondi sono necessariamente omozigoti, vale a dire tipi puri rispetto alla pigmentazione: le loro cellule somatiche e germinali mancano completamente del carattere bruno.

Tutt'altro comportamento dobbiamo aspettarci invece per i genitori bruni, i quali possono essere omozigoti, ma anche eterozigoti, vale a dire avere il carattere biondo in latenza per un incrocio precedente col tipo chiaro. La possibilità di un tale incrocio varia enormemente secondo i paesi: da noi, ad es., i bruni della Sardegna hanno la massima probabilità di essere tipi puri, vale a dire omozigoti, mentre tale probabilità è minima per i bruni del Veneto. Ma, a parte questo criterio di probabilità, a priori non è possibile dire se un bruno è omozigoto o eterozigoto, si può stabilire invece

(1) J. Frédéric, *Beiträge zur Frage des Albinismus.* Zeitsch. f. Morph. u Anthrop. X. (1897), p. 233-234.

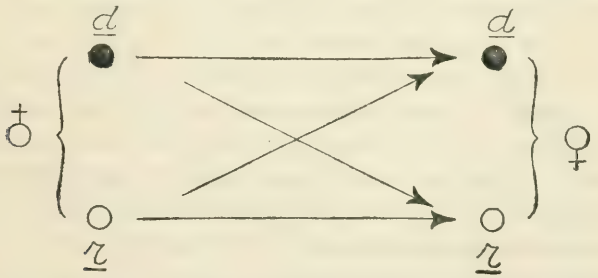
(2) V. Haecker, *Op. cit.* p. 245-246.

dalla discendenza che esso ha incrociandosi col tipo biondo. Poichè, se di quattro figli due sono biondi e due bruni, vuol dire che il genitore bruno era eterozigoto, aveva latente il tipo biondo, e perciò si verifica la regola anzidetta del 50%; se invece tutti i figli sono bruni, vuol dire che il genitore bruno era omozigoto, e perciò ha occultato completamente il suo antagonista.

Se infine da due genitori bruni si hanno quattro figli, uno dei quali è biondo, vuol dire che entrambi i genitori erano eterozigoti (poichè se fosse stato uno solo, l'altro, cioè l'omozigoto, avrebbe esercitato la sua dominanza completa, come nel caso precedente), vale a dire entrambi provenivano da incroci col tipo biondo: è il caso del nipote che rassomiglia al nonno, e la regola è sempre quella del 25%, che già conosciamo.

Forse il colore cutaneo e anche quello dei capelli non si prestano abbastanza bene a tali constatazioni, essendovi le tinte intermedie. Ma gli stessi fatti si verificano per il colore delle iridi. Se due uomini a occhi azzurri sposano due donne a occhi scuri, possono avere figli con occhi scuri eterozigoti, le cui cellule germinali o gameti hanno perciò soltanto il 50% di determinanti scuri per l'iride. Se questi individui sposano fra loro, un figlio su quattro ha gli occhi azzurri degli avi.

Da quest'esempio si vede che il colore azzurro dell'iride si comporta rispetto allo scuro come l'albino fa col grigio o il biondo col bruno, cioè come carattere dominato o recessivo. Infatti, se alla prima generazione le iridi sono tutte scure, è perchè è rimasto latente il carattere azzurro, mentre alla seconda generazione si fa palese la separazione dei determinanti, come mostra questo schema, in cui, secondo la nota convenzione, *d* è il carattere dominante (iride scura) e *r* il carattere recessivo (iride azzurra).



Il carattere dominante viene completamente escluso una volta su quattro, cioè nel 25%: difatti i determinanti maschili ♂ non possono riunirsi ai femminili ♀, se non secondo le quattro freccie disegnate nello schema che ho ideato, il quale risulta perciò chiarissimo.

Ugualmente succede se invece di azzurre le iridi siano grigie; però, essendo l'ordine di dominanza, secondo le richerche dei Davenport(1), che lo scuro domina sul grigio, il grigio sull'azzurro, ne viene che il colore grigio può essere eterozigoto, avere cioè in latenza l'azzurro; mentre l'azzurro

(come abbiamo visto per il carattere albino e il biondo) non può avere nessun altro carattere in latenza, è un carattere puro. *Genitori con occhi azzurri non possono avere che figli con occhi azzurri.*

Anche lo Hurst ha dimostrato l'ereditarietà del colore dell'iride, valendosi di una distinzione un po' differente(2). Egli ha fatto due categorie di colori dell'iride: iridi semplici e iridi doppie. Le prime sono azzurre o azzurro-grigiastre; le doppie, che sono tutte le altre, contengono più o meno anche del pigmento, in quegli strati in cui le iridi semplici sono invece prive di pigmento. Ora le iridi doppie sono dominanti sulle semplici, per cui possono essere omozigote o eterozigote, e ciò all'esterno non si riconosce; ma da quel che abbiamo precdentemente stabilito si può arguire quali eventualità sono possibili e con quali risultati. Per cui lo Hurst ha proceduto senza difficoltà ai rispettivi aggruppamenti dei progenitori, ottenendo questo prospetto che conferma le leggi mendeliane.

Colore dell'iride dei figli.

Colore dell'iride dei genitori.	Totale dei casi.	doppio.	semplice.	doppio : semplice (rapporto pro 4) trovato.		calcolato
Semplice x semplice	101	0	101	0	: 4	0 : 4
Doppio x doppio om.	195	195	0	4	: 0	4 : 0
Doppio eter. x doppio eter.	63	45	18	2,86	: 1,14	3:1(±0·22)
Semplice x doppio om.	66	66	0	4	: 0	4:0
Semplice x doppio eter.	258	137	121	2,12	: 1,88	2:2(±0·13)

Infine Carlo Davenport ha stabilito l'ordine di dominanza per la forma dei capelli(3), la quale pure mendelizza. I capelli diritti o lisci, a forma di crine di cavallo, sono recessivi rispetto ai crespi o lanosi, diguisachè *genitori a capelli lisci non possono avere che figli a capelli lisci.* È perciò che questa forma di capello ha una diffusione così omogenea e compatta, come si vede nei cinesi, e in grado minore negl'indigeni Americani. Ma dove queste razze lissotriche s'incontrano con stirpi a capelli crespi, ulotriche, esse non possono mantenere la forma liscia che in una frazione della discendenza, quella frazione (25%) che atavizza, come abbiamo visto. Nello stesso tempo però anche la percentuale dei capelli crespi non aumenta di fronte a quella dei capelli lisci, ma si mantiene anch'essa al 25% della

(1) C. B. Davenport, *Heredity of Eye-Colour in Man.* Science, New Series XXVI. (Nov., 1907), p. 592.

(2) C. C. Hurst, *On the Inheritance of Eye-Colour in Man.* Pro. Royal Soc. B., LXXX. (1908), p. 85.

(3) C. B. Davenport, *Heredity of some human physical characters.* Proceed. Society for Experim. Biol. and Medic. 1908, p. 101.

discendenza. Gli altri due quarti, che ordinariamente andrebbero annessi al carattere dominante, cioè al crespo, in questo caso vengono diluiti passando alla forma ondulata: la dominanza del carattere crespo è imperfetta.

Alle isole Filippine è stata confermata, dalle recenti ricerche del Bean, la dominanza del carattere ulotrico, che ivi è presentato dal tipo Negrito: onde molti individui possono a prima vista essere scambiati per Negriti, mentre sono ibridi che non presentano di negrito che il carattere dei capelli e niente altro(1). Questa disgiunzione si avvera, dice il medesimo Bean, conforme la seconda regola di Mendel, e non soltanto per i capelli, ma per la fisonomia, per la forma dell' orecchio, per la forma del naso, per la lunghezza delle estremità: tutti questi caratteri esistono come unità separatamente ereditarie, *caratteri-unità*. Ma succede altresì che parecchi di questi caratteri si accordano tra loro in modo che il loro insieme può venire ereditato anch'esso come carattere-unità.

In altre parole si verifica *l'indipendenza dei caratteri*, ciò che si chiama la *terza regola di Mendel*, vale a dire, quando i genitori invece di differire per un solo carattere (onde i discendenti sono *monoibridi*), differiscono per due o più caratteri (onde si hanno discendenti *diibridi* o *poliibridi* secondo la terminologia del De Vries), allora le singole coppie antagonistiche di caratteri si comportano l'una indipendentemente dell'altra. E lo stesso vale per quelle coppie antagonistiche che sono formate da più caratteri riuniti, come sopra si è detto, le quali il Bateson ha chiamato " allelomorfi composti."

Si può immaginare quale varietà di risultati si ha nei poliibridi delle Filippine, dato che può apparire il carattere dominante o il dominato, secondo le proporzioni note. Supponiamo che si tratti di *triibridi*: indicando con tre lettere maiuscole i tre caratteri dominanti e con le rispettive minuscole i corrispondenti caratteri recessivi, si ha per F_1, salvo il caso eventuale (verificatosi in certi esperimenti del Bateson) di " incompatibilità di caratteri " : 27 *A B C* : 9 *a B C* : 9 *A B c* : 9 *A b C* : 3 *A b c* : 3 *a B c* : 3 *a b C* : 1 *a b c*.

Ma oltre a ciò si può avere anche la *fusione dei caratteri antagonistici*(2). Il Bean conferma infatti che il capello ondulato appare come prodotto di incroci fra gli ulotrichi e i lissotrichi(3) mentre, com'è noto, in altre regioni è un carattere autonomo, ad es. in molti Sud-americani. Ciò ch'è più strano è la dominanza della faccia glabra sulla barbuta, il che indicherebbe che

(1) R. Bennett Bean, *Types of Negrito in the Philippine Islands.* American Anthropologist, 1910, p. 234.

(2) V. Haecker, *Op. cit.* p. 296.

(3) R. Bennett Bean, *Philippine Types.* American Anthropologist, 1910, n. 3, p. 381.

la deficienza del sistema pilifero, addotta dal Morselli come carattere progressivo e recente, è forse una mutazione più antica dell'altra verificatasi per un arresto di sviluppo, come il collo spenacchiato di certe galline, delle quali parla il Cuénot.

E' meraviglioso come il De Quatrefages, con vero intuito di naturalista, abbia visto tutto ciò prima della riesumazione delle scoperte del Mendel, che certamente egli ignorava come i suoi contemporanei. E acciocchè il merito non venga adesso attribuito ad altri antropologi (il che può anche avvenire per ignoranza o servilismo, se non è già avvenuto), voglio riferire per esteso ciò ch'egli scriveva quasi un quarto di secolo fa.

> " L'union d'individus de races différentes entraîne entre leurs deux " natures une lutte dont le théatre est le champ où s'organise le nouvel " être. Or, cette lutte n'a pa lieu en bloc, pour ainsi dire, comme " on a généralement admis. Chacun des caractères des deux parents " combat pour son propre compte contre le caractère correspondant " (il suo *antagonista*, come adesso si dice). Lorsque l'énergie héré- " ditaire est égale de part et d'autre il s'ensuit nécessairement une " sorte de transaction, dont la conséquence est la *fusion* des caractères " maternel et paternel en un caractère intermédiaire. Si les énergies " sont très inégales, le métis hérite d'un caractère emprunté de toutes " pièces à l'un de ses parents; mais celui-ci, vainqueur sur un point, " peut être vaincu sur un autre. De là, résulte chez le métis la " *juxtaposition* de caractères pris à chacun des types dont il est le " fils(1)."

Dà anche la figura di una creola con la capigliatura di Negra, la fisonomia di Bianca e il colore cutaneo intermedio. Molto più raro è il caso che uno dei due tipi sia riprodotto in tutti i suoi caratteri. " Nelle generazioni successive l'eredità alternante e l'atavismo entrano in campo." Il De Quatrefages parla anche delle juxtaposizioni da lui osservate nei caratteri scheletrici.

Giustamente egli pensava che tutto ciò era favorevole al monogenismo; e infatti noi vediamo che quasi tutti coloro che si sono occupati delle cosidette leggi mendeliane hanno parlato di varietà di una medesima specie, cominciando dallo stesso Mendel che incrociò 22 varietà o sottospecie di *Pisum sativum*, al Lang che incrociò due varietà di *Helix ortensis*, al Correns che incrociò *l'Urtica pilulifera* e *l'Urtica dodartii* che sono due varietà, nonostante il nome linneano, com'è affermato da naturalisti, e cosi molti altri; poichè nè le galline del Davenport, nè i conigli dello Hurst,

(1) A. De Quatrefages, *Introduction à l'étude des races humaines*. Paris, 1889, p. 182 e segg. Vedi anche p. 418. Questa " separazione dei caratteri " dei genitori era stata già notata dal Buffon nei suoi esperimenti di ibridismo.

nè i topi del Cuénot e del Darbishire sono appartenenti a specie diverse, e tanto meno a specie assegnate a generi distinti. Non vi è che qualche poligenista dell'Uomo, il quale parla con disinvoltura non invidiabile di ibridi fra specie e di ibridi bigeneri (nell'uomo!); mentre oramai da tutti i biologi la parola "ibridi" si adopera, nel maggior numero e quasi nella totalità dei casi, al posto dell'antico vocabolo "meticci" e per indicare incroci fra varietà, il che ai poligenisti non fa altrettanto comodo. E'un processo di riduzione della scienza *ad usum delphini*, dove le eccezioni sono cercate col lanternino e gonfiate smisuratamente, mettendo nell'ombra la regola generale. Presumono di trattare "il mammifero umano" alla stregua degli altri mammiferi e quasi reclamano con fiato sprecato una "privativa" di tale concetto, e in quali mani sia capitato il povero mammifero si vede dallo strazio che ne fanno galoppando a briglia sciolta.

Non occorre dire che per noi ha molto maggior peso la legge che ci viene data da un vero zoologo:

> "Le vrai hybridisme ne peut être considéré comme un des facteurs
> "de la formation de nouvelles espèces; car les espèces actuelles sont
> "précisément caractérisées par l'impossibilité de leur croisement, ou du
> "moins, par l'infécondité de leurs hybrides, dépendant de la con-
> "stitution différente de leurs gamètes"(1).

Siamo ben persuasi che l'antropologia va messa sulla via maestra della zoologia: infatti non abbiamo mai pensato che l'Uomo sia un essere a parte; quindi ciò non ci porta nessun scompiglio, e sopratutto non ci obliga a riprendere, correggere o completare il nuovo caos che si vorrebbe introdurre nella nostra scienza, il quale non è suscettibile di alcun miglioramento, ma soltanto di demolizione. L'indirizzo zoologico non ci può obbligare a credere che il brachicefalo alpino sia un ibrido bigenere (Sergi).

Oltre l'eredità mendeliana e la fusione si può avere anche il cosidetto *mosaico*, che probabilmente è da interpretare come qualche cosa di intermedio fra le due, cioè una fusione incompleta: tutti e tre questi casi si hanno negl'incroci fra Negrito e Europei. Ma è sopratutto sulle cosidette leggi di dominanza che ho voluto richiamare l'attenzione, per la loro grande importanza. Infatti, non è azzardato prevedere che, queste leggi di dominanza, quando saranno note per tutti i caratteri e per tutte le razze umane, ci daranno qualche base positiva (da aggiungere agli altri dati) anche per induzioni filogenetiche. Abbiamo visto sin da principio che i caratteri dominanti, quali si manifestano incrociando topi di diverse razze, sono quasi tutti, tranne uno, gli stessi caratteri che presenta la forma ancestrale

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(1) E. Giglio-Tos, *Les problèmes de la vie.* Part IV. *La variation et l'origine des espèces.* Cagliari, 1910, p. 214.

di *Mus musculus*, quella dalla quale sono derivate le altre varietà. Allora con molta probabilità, anche per l'Uomo i caratteri dominanti sono pure gli originari, e il bruno (da non confondere col Negro) a capelli lanosi appare come un tipo ancestrale, nei limiti delle esperienze fatte.

THE SO-CALLED LAWS OF INHERITANCE IN MAN.

By PROFESSOR V. GIUFFRIDA-RUGGERI,
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Morselli, in his great work, "General Anthropology," recently completed, several times touches upon the possibility that the Mendelian laws find verification in man. Thanks to recent researches, carried out chiefly in the United States and England, it is now certain that the races of man act exactly as the races of animals. In order fully to understand such researches it is, however, opportune to allude to the classical experiments of Cuénot upon mice, to which I may briefly refer.

Every race, whether a sub-species or a variety—zoologists employ these three words without much verbal subtlety—has an hereditary possession of certain characters, a possession which is completely transmitted to the descendants, in whom is preserved the same germ-plasm as in the progenitors, who have the same *biotype* (Johannsen). Cuénot has investigated the behaviour of the germ-plasm of the grey mouse, which may be considered as the common ancestor of other forms or races or varieties of *Mus musculus*. This contains a certain number of *determinants* (not in Weismann's sense) or hereditary unities or genera, each of which is capable of changes or mutations. In the ancestral type there are at least six sorts or categories of determinants, which may be conventionally designated by the letters C, G, F, M, U, R. If any one of these determinants is modified we obtain another elementary form of mouse or *genotype*, which differs in some respects from the ancestor, which is a mutation (not in the sense of De Vries) slight or marked of it. The various categories of determinants have presented, in the course of time, a variable number of determinants, one, two, or more. Nine mutations of the original determinants of the grey mouse are thoroughly ascertained, then in all fifteen determinants of as many characters. Of these characters some are dominant, others are subject, recessive or latent. In the general compendium, which we reproduce here, the dominants occupy the first row, and so the others in succession in order of dominance, the capital letters indicate the determinants of the grey mouse, which are all, except one, in the first row, that is to say, are dominants.

1	2	3	4	5	6
C	j	F	M	U	R
a	g'	d	x	p	w
	G		e		
	n				

In order that a type be vital, *i.e.*, be a *biotype*, it is necessary that it should have six different categories of determinants, but each category can be represented by any one of the determinants which are assigned to it. Thus, there may be theoretically 192 different combinations, *genotypes*, or forms of mouse having a special hereditary formula; as there might be just as many combinations for man, if also in him there were at disposition 15 determinants, subdivided into six indispensable categories. The multiplicity of the human races is not, therefore, a zoological heresy.

We have said that some of these determinants are dominant and others subject or latent, according to the doctrine established from the experiments of Mendel made since 1860. This alternative is verified in crossings, when the two individuals which we wish to cross present two different determinants of one and the same category; so then in the descendants it is quickly seen which of the two determinants is the dominant one. For example, when we cross the grey mouse and the white mouse, all the offspring are absolutely of the same grey appearance; so we conclude that the determinant of the grey character is dominant over the white, since where there is dominance the first law of Mendel is verified (1) that is, the uniformity of the F (according to Bateson's terminology), that is of the first bastard filiation.

But the character of whiteness is latent in these grey mice of the first hybridisation; hence, while their progenitors were omozigotes, or pure types, they are in turn heterozygotes, their hereditary qualities are commingled of two alternative unities, which are the " allelomorphs " of Bateson(2), that is to say, of two opposed potentialities. Only one of these potentialities is visible externally, but the two determinants (like all the others of the hereditary formula) have passed into all the cells of their body, including the sexual cells, and these are separated the one from the other, which is called disjunction or *separation of the determinants*, and constitutes the second law of Mendel which concerns F_2, so that one half of the gametes (ova or sperm cells) receive the determinant of the character of greyness, and the other half the determinant of the character of whiteness, according to the *hypothesis of the purity of the gametes*. Thus, on crossing these grey

(1) V. Haecker, *Allgemeine Vererbungslehre*, Braunschweig, 1911, p. 11.

(2) W. Bateson, *Mendel's Principles of Heredity*, Cambridge, 1909.

heterozygote mice with each other there are four possibilities in the offspring : one of which is that of having the male and the female gamete with the same white determinant, therefore the zygote (*i.e.*, the fecundated ovum) is homogeneous for such character, and the individual which results from it is homozygote, as it is homozygote in the other possibility of the male and female gamete with the same grey determinant; one half of the offspring is in turn heterozygote, but nevertheless grey, this being the dominant character, while the character of whiteness is latent.

The result is : if we cross grey homozygote mice with each other all the offspring are grey (and naturally homozygote as the progenitors); if instead we cross grey heterozygote mice there will be 25 per cent. of white mice amongst the offspring.

If one of the heterozygote grey mice is crossed with a white mouse, inasmuch as this last has only gametes with a white determinant and the former has instead two opposed determinants (grey and white), there are two possibilities—either the grey meets the white or the white meets the white, in the former case we get a grey mouse (heterozygote), in the second case a white mouse. That is to say, half of the offspring are white.

The successive generations behave in the same manner, so, to sum up, white, as the dominant character, is always homozygote from the moment which cannot be evident except when its opposed dominant—*i.e.*, grey—is completely wanting both in the somatic cells and in the germ cells.

In many other albino animals the same rules have been found which will find their verification also in human albinos, since the Davenports have succeeded in proving that two albino parents have only albino children(1). Still more important is the fact proved by the same Gertrude and Carlo Davenport, that if one only of the parents is albino 50 per cent. of the children are albino. That implies that the other parent, although normally pigmented, behaves like the heterozygote grey mouse, *i.e.*, with the albino character remaining latent. And this is precisely the explanation given by the Davenports. This explanation is also implicitly valid for albinos born of parents both of whom are pigmented, *i.e.*, that both these parents must possess the character of albinism as a recessive : in such a case it could only appear once in four children, according to that rule of 25 per cent. which we have seen for the offspring of two heterozygote grey mice.

The Davenports in their very extensive researches have had instead an average of 34 per cent., but that is explained by them by the fact that the reporters easily omit a normal child, rather than an abnormal one, as the abnormal one is just the special object of the inquiry. It can also be asserted that 33 per cent. of these same families showed consanguinity of parentage, whence it is evident that the latent character, *i.e.*, albinism, came to them from a common ancestor, and that is probable in many other cases

(1) G. C. and C. B. Davenport, *Heredity of Skin Pigment in Man.* American Naturalist XLIV. (1910), Nov.-Dec., p. 727.

if we consider that this can also happen amongst distantly related cousins, who are naturally ignorant of their relationship.

The recessive character of albinism and obedience to the Mendelian law seem, then, well established, in spite of the mathematical criticisms of Pearson, which we pass over, as the same Davenports have replied to them.

Without wishing to enter into particulars special mention should, however, be made of a family of mulattos of Louisiana with partial hereditary albinism, which has been studied in Italy by Frassetto and Levi(1). The genealogical tree shows various generations, each of which presented one albino parent. But one of these generations is specially interesting for the large number of children born to one couple, viz., 15, of whom eight were albinos: the percentage of albinism is very nearly 50 per cent., as was foreseen from the theory, admitting that the normally pigmented parent had had the character of albinism as a recessive, according to the formula (dr × r r), in which d = dominant, r = recessive or remissive. In the next generation the descendants are still few (and also their number varies according to the two authorities), and their behaviour would make it difficult—if it were not too soon to draw conclusions—to deny that they confirm the Mendelian law.

On the other hand, if the normally pigmented parent does not possess the character of albinism as a recessive the behaviour is different—*i.e.*, in the first generation none of the children ought to show evident albinism. The case of Farabee(2) is much to the point. An albino negro wedded to a negress had three normally pigmented children. But the latent albinism showed itself in the second generation exactly as we have seen for the albino mice. Since one of the three sons had 15 children of two negresses, of whom four were albinos, which corresponds precisely to the division of the determinants, the isolated recessive character remaining and hence being evident in the four children. This behaviour shows that even in the second generation the character of albinism was recessive in only one of the two parents; otherwise the proportion would have been 50 per cent. as in the case Frassetto-Levi. Clearly families with few children afford much less demonstration.

As a general rule when a generation is passed over, as in the case referred to, it may be said that the character is recessive. It would seem that red hair is in a similar case, since Frédéric refers to a southern German with red hair, who had two sisters with brown hair, both the parents also had brown hair, while one grandmother had red hair.

Nevertheless, Frédéric, with much caution, leaves the question of Mendelism in suspense, whether as regards red hair or albinism, although

(1) E. Levi, *Albinismo parziale eredo-famigliare in Negri della Luisiana.* Arch. per l'Antrop. e l'Etnol XXXIX. (1909), fasc. 1; F. Frassetto, *Casi di albinismo parziale ereditario nella famiglia Anderson della Luisiana.* Atti Soc. Rom. di Antrop. XV. (1910), fasc. 2.

(2) W. C. Farabee, *Notes on a Negro Albinism.* Science, New Series, XVII. (1903), Jan.-June.

noting the great importance which consanguinity has for the latter, not from the fact that the two parents are related but because they possess the same special recessive disposition, which tends to the appearance of the corresponding anomaly, as can be verified also by so many tendencies of disease(1).

Haecker(2), also, maintains that albinism, especially in the negro, is a recessive character, and cites the striking case of Farabee, not being acquainted with the case observed in Italy.

More important for anthropology is normal pigmentation, dark or fair, brunette type or blond type, as is commonly said. Former anthropologists have maintained that the blond type is simply a loss of colour from the brunette type, as if one were dealing with a garment or a coloured liquid, which loses its colour gradually with time. That view can no longer be maintained; from the new doctrine it is clear that it is not a question of a single character more or less attenuated, but that we are dealing with two characters clearly marked out from the time of the progenitors.

It follows from the interesting researches of the Davenports that a total of 115 families, in which both the parents were fair, had 513 children, of whom only 1.75 per cent. were dark, which for various reasons is negligible, so that we may accept the rule that blond parents have only blond children. This is so because the blond mutation behaves similarly to the albino mutation: it is recessive in relation to the brunette type, hence the blonds are necessarily homozygote, that is to say pure types as regards pigmentation: their somatic and germ cells are entirely wanting in the brunette character. Quite a different behaviour must be expected, instead, for the brunette parents, who can be homozygote, but also heterozygote, that is to say may have the blond character latent in consequence of a previous crossing with the fair type. The possibility of such a crossing varies enormously with the country. With us, for example, the brunettes of Sardinia have the greatest probability of being pure types, that is to say homozygotes, while such probability is least with the brunettes of the Venetian territory. But, apart from this criterion of probability, it is not possible to say *à priori* whether a brunette is homozygote or heterozygote. It may be demonstrated, instead, from the descent that this type has been crossed with the blond type. Hence, if of four children two are blond and two brunette, it amounts to saying that the brunette parent was heterozygote, had the blond type latent, and thus is verified the aforesaid rule of 50 per cent. If, on the other hand, all the children are brunettes it amounts to saying that the brunette parent was homozygote, and therefore has wholly concealed its antagonist. If, finally, from two brunette parents there are four children one of whom is blond, it implies that both the parents were heterozygotes

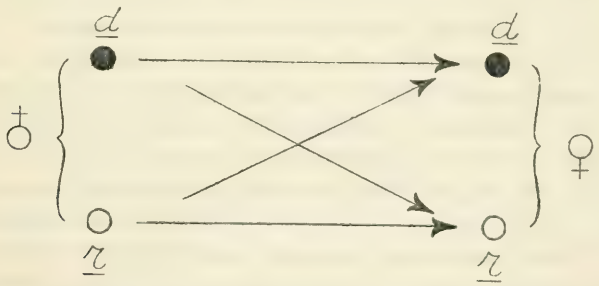
(1) J. Frédéric, *Beiträge zur Frage des Albinismus*. Zeitsch. f. Morph. u. Anthrop. X. (1897), p. 233-234.

(2) V. Haecker, *Op. cit.* p. 245-246.

(since if only one had been so, the other, *i.e.*, the homozygote, would have exercised its complete dominance, as in the preceding case), that is to say both sprung from crossings with the blond type: such is the case of the grandson who resembles the grandfather, and the rule is always that of 25 per cent., which we know already.

Perhaps the colour of the skin and that of the hair do not sufficiently lend themselves to such assertions, there being intermediate tints. But the same facts are verified by the colour of the iris. If two men with blue eyes marry two women with dark eyes, they may have children with dark heterozygote eyes, whose germ cells or gametes have, therefore, only 50 per cent. of dark determinants for the iris. If these individuals marry amongst each other, one child in four has the blue eyes of the grandparents.

From this example it is seen that the blue colour of the iris acts with regard to the dark colour as the albino does with the grey, and the blond with the brunette, *i.e.*, as a subject or recessive character. In fact, if the irises are all dark in the first generation, it is because the blue character has remained latent, while in the second generation the separation of the determinants becomes evident, as our scheme shows, in which, according to the recognised convention, d is the dominant character (dark iris), and r the recessive character (blue iris).



The dominant character is completely excluded once in four, i.e., in 25 per cent.; in fact, the male determinants ♂ cannot unite with the female ♀ except according to the four arrows marked in the scheme, which I have supposed, which, therefore, gives a very clear result.

It follows equally if, instead of blue, the irises are grey; therefore, it being the order of dominance, according to the researches of the Davenports(1), that dark is dominant for grey, grey for blue, it follows that grey can be heterozygote, can have blue latent; while blue (as we have seen for the albino or the blond character) can have no other latent character; it is a pure character. *Parents with blue eyes can only have children with blue eyes.*

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(1) C. B. Davenport, *Heredity of Eye-Colour in Man.* Science, New Series XXVI. (Nov., 1907), p. 592.

Hurst, also, has shown the hereditary character of the colour of the iris, availing himself of a slightly different distinction(1). He has made two categories of colours of the iris—simple irises and double irises. The first are blue or blue-grey; the double, which include all the others, have more or less of pigment in those layers in which the simple irises are, on the other hand, destitute of pigment. Now, the double irises are dominant over the simple, so that they can be homozygote or heterozygote, and this cannot be recognised externally, but from what we have previously proved it can be shown what eventualities are possible, and with what results. Thus Hurst has easily proceeded to the respective groupings of the progenitors, obtaining that view which confirms the Mendelian laws.

COLOUR OF THE IRIS OF THE CHILDREN.

Colour of the Iris of the Parents.	Total No. of Cases.	Double.	Single.	Double : single (report for 4) found.		Proportion.
Single × Single	101	0	101	0	: 4	0 : 4
Double × Double omoz.	195	195	0	4	: 0	4 : 0
Double heters. × Double heterz.	63	45	18	2·86	: 1,14	3 : 1 (±0·22)
Single × Double omoz. ...	66	66	0	4	: 0	4 : 0
Single × Double heterz.	258	137	121	2,12	: 1,88	22 (±0·13)

Finally, Carlo Davenport has established the order of dominance by the form of the hair(2), which also obeys the Mendelian law. Straight or smooth hair, like that of a horse, is recessive with regard to curly or woolly hair, so that parents with smooth hair can only have children with smooth hair. And, therefore, this kind of hair has a homogeneous and compact diffusion, as is seen in the Chinese and in less degree in the native Americans. But where these smooth-haired races meet with curly-haired races these can only maintain the smooth form in a fraction of the descendants, which fraction, 25 per cent., shows atavism, as we have seen. In the same time, therefore, the percentage of curly hair does not increase compared with that of smooth hair, but is maintained in 25 per cent. of the descendants. The other two quarters, which usually would be conjoined to the dominant character, *i.e.*, to the curly variety, in this case are modified, passing to the wavy type. The dominance of the curly character is incomplete.

In the Philippine Islands, according to the recent researches of Bean, the dominance of the curly character, which is here presented by the Negrito type, has been confirmed. Whence many individuals may at first sight be mistaken for Negritos, while these are hybrids who present no Negrito

(1) C. C. Hurst, *On the Inheritance of Eye-Colour in Man*, Pro. Royal Soc. B., LXXX. (1908), p. 85.

(2) C. B. Davenport, *Heredity of some human physical characters.* Pro. Soc. for Experim. Biol. and Med. (1908), p. 101.

feature except the character of the hair(1). This separation, says the same Bean, confirms the second law of Mendel, and not only for the hair, but for the physiognomy, for the shape of the ear, for the shape of the nose, for the length of the extremities. All these characters exist as unities separately hereditary, character-unities. But it also follows that several of these characters agree amongst each other so that their totality can be also inherited as a character-unity.

In other words, *the independence of the characters*, what is called the third law of Mendel, is verified, that is to say, when the parents, instead of differing by a single character (whence the descendants are mono-hybrids), differ by two or more characters (whence these are di-hybrids or poly-hybrids, according to the terminology of De Vries), then the single antagonistic pairs of characters act independently one of the other, and the same holds good for those antagonistic pairs which are formed of more reunited characters, as was said above, which Bateson has called "compound allelomorphs."

It can be imagined what varieties of results take place in the poly-hybrids of the Philippinos, granted that the dominant or subject character can appear according to the known proportions. Let us suppose that it is a question of tri-hybrids: indicating the three dominant characters by the three capital letters and the three corresponding recessive characters by the respective small letters we get for F, with the exception of the eventual case (verified in certain experiments of Bateson) of "incompatibility of character": 27 A B C : 9 a B C : 9 A B c : 9 A b C : 3 A b c : 3 a B c : 3 a b C : 1 a b c.

But besides that we can also have *the fusion of antagonistic characters*(2). Bean, in fact, confirms the view that wavy hair appears as the product of crossings between the curly-haired and the smooth-haired(3), while, as is well known, in other regions, *e.g.*, in many South Americans, it is an autonomous character. What is still stranger is the dominance of the smooth face over the hairy face, which would tend to show that the deficiency in the hair-bearing structures, which Morselli advances as a progressive and recent character, is perhaps a more ancient mutation than the other, shown by an arrest of development, like the featherless neck of certain fowl of which Cuénot speaks.

It is extraordinary how De Quatrefages, with a naturalist's true intuition, should have seen all this previous to the re-affirmation of Mendel's discoveries, of which, like his contemporaries, he was certainly ignorant. And in order that the merit should not be attributed to other anthropologists (which can result from ignorance or servility, if it has not already done so), I wish to refer *in extenso* to what he wrote almost a quarter of a century ago—

(1) R. Bennett Bean, *Types of Negrito in the Philippine Islands.* American Anthropologist, 1910, p. 234.

(2) V. Haecker, *Op. cit.* p. 296.

(3) R. Bennett Bean, *Philippine Types.* American Anthropologist, 1910, n. 3, p. 381.

" The union of individuals of different races involves a contest between their two natures—a contest of which the theatre is the field where the new being is organised. Now, this contest does not take place *en bloc*, so to speak, as has been generally admitted. Each of the characters of the two parents struggles on its own account against the corresponding character (its antagonist, as has just been said). When the hereditary energy is equal on both sides there necessarily ensues a kind of process of which the consequence is the fusion of the maternal and paternal characters in an intermediate character. If the energies are very unequal the hybrid inherits a character borrowed entirely from one of his parents; but this parent, conqueror on one point, may be conquered upon another. Hence, there results with the hybrid a *juxtaposition* of characters derived from each of the types of which he is the child "(1).

He instances, also, the figure of a Creole with the head of hair of a negress, the physiognomy of a white and an intermediate colour of the skin. Much rarer is the case where one of the two types is reproduced in all its characters. " In successive generations alternate heredity and atavism came into view." De Quatrefages also speaks of the juxtaposition of skeletal characters observed by him. He was quite of opinion that all that was favourable to monogenismus; and, in fact, we see that almost all those who have been occupied with the so-called Mendelian laws have spoken of varieties of one and the same species, commencing from Mendel himself, who crossed 22 varieties or sub-species of *Pisum sativum*, to Lang, who crossed two varieties of *Helix ortensis*, to Correns, who crossed *l'Urtica pilulifera* and *l'Urtica Dodartü*, which are two varieties, notwithstanding the Linnœan name, as is affirmed by naturalists, and so many other authorities. Hence, neither Davenport's fowls, nor Hurst's rabbits, nor the mice of Cuénot and Darbishire belonged to different species, and still less to species assigned to distinct genera. There is a certain Polygenist in the case of man, who speaks with unenviable confidence of hybrids between species and of hybrids between genera (in man!), while at the present day the word " hybrid " is adopted by all biologists in the greater number and in almost all cases instead of the old word " mongrel " to indicate crossings amongst varieties, which is not any more convenient to the polygenists. It is a process of reducing science *ad usum delphini*, where the exceptions are sought out with a lantern, and absurdly exaggerated, putting the general rule quite into the shade. They presume to treat " the human mammal " in line with the other mammals, and as it were claim with a waste of breath a patent-right of such a conception, and in what sort of hands the poor beast has fallen is seen from the tortures which they inflict upon it at full tilt.

It is hardly necessary to say that with us much more weight is assigned to the law propounded by a true zoologist—" True hybridism cannot be

(1) A. De Quatrefages, *Introduction à l'étude des races humaines*. Paris, 1889, p. 182.

considered as one of the factors in the formation of new species : for existing species are characterised precisely by the impossibility of crossing them, or at least, by the sterility of their hybrids, depending upon the different constitution of the gametes "(1).

We are convinced that anthropology must be put upon the main path of zoology : in fact, we have never thought that man is a being apart ; hence there is no confusion, and above all we are not obliged to take in hand, correct, or make good the chaos which would thus be introduced into our science—a chaos which is not capable of any amendment but only of destruction. The zoological guide does not oblige us to believe that the brachycephalic of the Alps is a hybrid of two species (Sergi).

Besides Mendelian heredity and fusion we can have the so-called "Mosaic," which may be probably interpreted as something intermediate between the two, i.e., an incomplete fusion : all the three cases are found in crossings between the Negrito and Europeans. But it is, above all, to the so-called laws of dominance that I have wished to call attention, because of their great importance. In fact, it is not rash to foresee that these laws of dominance, when they become known in all their characters and for all races, will give some positive foundation (to add to the other data) for philogenetic inductions. We have seen from the first that the dominant characters which are shown by crossing mice of different races are almost all, except one, the same characters which the ancestral form of *Mus musculus* presents, from which the other varieties are derived.

Thus, we may conclude, with much probability also in the case of man, that the dominant characters are likewise the original ones, and the brunette (not to be confounded with the negro with woolly hair) appears as an ancestral type within the limits of our experience.

THE INHERITANCE OF FECUNDITY.

By Raymond Pearl, Ph.D.,

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A thorough and searching investigation of two great biological problems is a necessary pre-requisite to any substantial advance of the science of eugenics. These problems are :—

1. The mode of inheritance of human characters and traits of all kinds.
2. The physiology of reproduction in man, particularly with reference to human fecundity and fertility.

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(1) E. Giglio-Tos, *Les problèmes de la vie.* Part IV. *La variation et l'origine des espèces.* Cagliari, 1910, p. 214.

The progressive decline of the birth rate in all, or nearly all, civilized countries is an obvious and impressive fact. Equally obvious and much more disturbing is the fact that this decline is differential. Generally it is true that those racial stocks which by common agreement are of high, if not the highest, value, to the state or nation, are precisely the ones where the decline in reproduction rate has been most marked.

The causes concerned in the production of these results are, without question, exceedingly complex and difficult, if not impossible, of complete analysis. But of one thing we may be certain; somewhere in the complex of causes is included the biological factor as one element. Fecundity and fertility are physiological characters of the organism, subject to variation and capable of being inherited, just in the same manner as structural characters. We must be in possession of definite information regarding the physiology of fecundity and fertility, before it will be possible to make safe and sure advance in the social and eugenic analysis of matters involving these factors, such as, for example, the declining birth-rate.

The basic eugenic significance of that characteristic of organisms termed fecundity furnishes sufficient justification, I hope, for bringing to the attention of this Congress certain results regarding fecundity in one of the lower animals, namely the domestic fowl. In some particulars the results are, I believe, novel. They indicate, for the first time, the precise mode by which this complex physiological character fecundity is inherited. It will be the purpose of this paper to present—necessarily very briefly and without the detailed supporting evidence—the essential results of a study of fecundity in poultry, pointing out at the end some possible eugenic bearings of the results.*

During the course of this investigation into the inheritance of fecundity in the domestic fowl, which has now involved thirteen generations and several thousand individuals, two definite and clear-cut results have come to light. These are:—

First.—That the record of egg production or fecundity of a hen is not, of itself, a criterion of any value whatsoever from which to predict the probable egg production of her female progeny. An analysis of the records of production of large numbers of birds shows beyond any possibility of

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* The results set forth below were first presented at the meeting of the American Society of Naturalists at Princeton, N.J., in December, 1911. A complete report with full presentation of the experimental data will shortly be published, probably in the Journal of Experimental Zoology.

doubt that, in general, there is no correlation between the egg production of individuals and either their ancestors or their progeny.

Second.—That, notwithstanding the fact just mentioned, fecundity is, in some manner or other, inherited in the domestic fowl. This must clearly be so, to mention but a single reason, because it has been possible to isolate and propagate from a mixed flock " pedigree lines " or strains of birds which breed true, generation after generation, to definite degrees of fecundity. Some of these lines breed true to a high condition or degree of the character fecundity; others to a low state or degree.

Definite as these results are they give no clue as to *how* fecundity is inherited; what the mechanism is. It is believed that now a first approximation to the solution of this problem has finally been reached. While there remain obscure points yet to be cleared up, and more data are needed definitely to decide between certain alternatives, yet the results now in hand appear to indicate quite clearly the general character of the mechanism of the inheritance of fecundity, and to show what lines further investigation of the problem may most profitably take.

At the outstart it will be well to understand clearly what is meant by the term fecundity as here used. I have used the term " fecundity " only to designate the innate potential reproductive capacity of the individual organism, as denoted by its ability to form and separate from the body mature germ cells. Fecundity in the female will depend upon the production of ova and in the male upon the production of spermatozoa.

Fecundity is obviously a character depending upon the interaction of several factors. In the first place the number of ova separated from the body by a hen or any other animal must depend, in part at least, upon an *anatomical* basis, namely the number of ova present in the ovary and available for discharge. Further there must be involved a series of physiological factors. It has been possible to prove that the mere presence of an anatomically normal reproductive system, including a normal ovary with a full complement of ova, and a normal oviduct, is not enough to insure that a hen shall lay eggs, that is, exhibit actual as well as potential fecundity. While comparatively very rare, cases do occur in which a bird possesses a perfect ovary and perfect oviduct and is in all other respects entirely normal and healthy, yet never lays even a single egg in her lifetime. Such cases as these prove: first, that what we may call the anatomical factor is not alone sufficient to make potential fecundity actual; and second, that the anatomical and physiological factors are distinct, in the sense that the normal existence of one in an individual does not necessarily imply the co-existence of the other in the same individual.

Turning now to the physiological factors involved in fecundity it would appear that there are at least two such factors or groups of factors. The first of the physiological factors involved may be designated the " normal ovulation " factor. By this is meant the complex of physiological

conditions which taken together determine the laying of about such a number of eggs as represents the normal reproductive activity of the wild *Gallus bankiva*. It must be remembered that, for reasons which cannot be gone into here, under conditions of domestication the activity of this normal ovulation factor will mean the production of considerably more eggs than under wild conditions. Egg production involves certain definite and rather severe metabolic demands, which under wild conditions will not always, or even often be met. Further, as has been especially emphasized by Herrick, egg laying in wild birds is simply one phase of a cyclical process. If the cycle is not disturbed in any way the egg production is simply the minimum required for the perpetuation of the race. If, however, the cycle is disturbed, as for example, by the eggs being removed from the nest as fast as they are laid, a very considerable increase in the total number of eggs produced will result.

It is a fact well known to poultrymen, and one capable of easy observation and confirmation, that different *breeds* and *strains* of poultry differ widely in their laying capacity. In saying this the writer would not be understood to affirm that a definite degree of fecundity is a fixed and *unalterable* characteristic by any particular breed. The history of breeds shows very clearly that certain breeds now notably poor in laying qualities were once particularly good. One of the best examples of this is the Polish fowl. But, in spite of this, not only do these breed and strain differences in fecundity exist, and probably always have existed, but they are *inherited*. Such inherited differences are independent of feeding or any other environmental factors. Thus a strain of Cornish Indian Games with which I have worked are poor layers, regardless of how they are fed and handled. This is merely a statement of particular fact; it does not imply that there may not exist other strains of Cornish Indian Games that are good layers.

Now in individuals which are high layers, and have this characteristic in hereditary form, there must be involved some sort of physiological factor in addition to the normal ovulation factor already discussed. An analysis of extensive statistics has shown that high fecundity represents essentially an addition of two definite seasonal, laying cycles to the basic normal reproduction cycles. These added periods of productivity are what may be called the winter cycle and the summer cycle. The winter cycle is the more important of these. It is the best measure of relative fecundity which we have and has been used as the chief unit of fecundity in these studies. It constitutes a distinct and definite entity in fecundity curves. The existence of these added fecundity cycles in high laying birds must depend upon some additional physiological factor or mechanism besides that which suffices for the normal reproductive egg production. Given the *basic* anatomical and physiological factors the bird only lays a *large* number of eggs if an additional factor is present.

We may next consider in greater detail these factors influencing fecundity, taking first

The Anatomical Basis of Fecundity.

Since, as already pointed out, egg production obviously depends in part upon the presence of ova in a normal ovary, a question which demands consideration is the following:—

To what extent are observed *variations* in fecundity (*i.e.*, in the number of eggs laid) to be referred to anatomical differences. In other words does the ovary of a high producing hen with, for example, a winter record of from 75 to 115 eggs, contain a larger number of oöcytes than does the ovary of a hen which is a poor producer, laying *no* eggs in the winter period and perhaps but 10 or 15 eggs in the year?

To get light upon this question the observations to be described have been made. The object was to arrive at as accurate a relative judgment as possible regarding the number of oöcytes in the ovaries of different individual birds. It is, of course, impossible practically to determine accurately the total absolute number of oöcytes in the ovary. What can be done, however, is to count the number of oöcytes which are visible to the unaided eye. While such results do not tell us, nor enable us to estimate with great accuracy, the total number of oöcytes in the ovary, they do nevertheless throw interesting and useful light on the questions raised above. Some counts of this kind are shown in Table I.

Table I.

Showing the Number of Visible Oöcytes in the Ovary of Certain Fowls.

Case No.	Bird No.	Breed.	Winter Production.	Total Visible Oöcytes.
1	8021	Barred Plymouth Rock ...	3	1228
2	8017	,, ,, ,, ...	0	1666
3	8030	,, ,, ,, ...	0	914
4	8005	,, ,, ,, ...	5	1174
5	1367	,, ,, ,, ...	3	2306
6	8018	,, ,, ,, ...	0	1194
7	8009	,, ,, ,, ...	0	2101
8	8010	,, ,, ,, ...	5	1576
9	425	,, ,, ,, ...	0	1521
10	3546	White Leghorn	54	2452
11	2067	,, ,, ...	32	3605
12	3453	,, ,, ...	0	1701
13	3833	,, ,, ...	0	2145
14	52	Cornish Indian Game ...	13	1550
15	71	F_1 Cross	106	2000

From this table it is in the first place clear that the number of oöcytes in the ovary of a hen is very large; much larger, I think, than has generally been supposed. While to be sure there are for the most part only vague statements respecting this point in the literature, usually these statements are to the effect that the bird's ovary contains " several hundred " ova.

Not only is the absolute number of oöcytes large, but it is also very much larger than the number of eggs which any hen ever lays. A record of 200 eggs in the year is a high record of fecundity for the domestic fowl, though in exceptional cases it may go even a hundred eggs higher than this. But even a 200-egg record is only a little more than a *tenth* of the average total number of *visible* oöcytes in a bird's ovary, to say nothing of the probably much larger number of oöcytes invisible to the unaided eye, but capable of growth and development. In other words it is quite evident from these figures that the potential " anatomical " fecundity is very much higher than the actually realized fecundity. This is true even if we suppose the bird to be allowed to live until it dies a natural death.

An examination of the table in detail indicates that there is no very close or definite relationship between the number of visible oöcytes in the ovary and the winter production of a bird. Thus No. 1367 and No. 3546 each have about the same number of visible oöcytes, yet one has a winter production record 18 times as great as the other. Again, No. 71 with the extraordinarily high winter record of 106 eggs has only a little more than one-half as many visible oöcytes as hen No. 2067, whose winter production record is only 32 eggs. Again No. 71 with its 106 record has very nearly the same oöcyte count as No. 8010 with a winter record of zero. In general it may be said that the present figures give no indication that there is any correlation between fecundity as measured by winter production, and the number of oöcytes in the ovary. Of course, the present statistics are meagre. More ample figures are needed (and are being collected) from which to measure the correlation between actual and " anatomical " fecundity.

The data now in hand however indicate clearly, it seems to me, that there must be some other factor than the anatomical one involved in the existence of different degrees of actual fecundity in the domestic fowl. It evidently is the case that when one bird has a winter record of twice what another bird has it is *not* because the first has twice as many oöcytes in the ovary. On the contrary it appears that *all* birds have an anatomical endowment entirely sufficient for a very high degree of fecundity, and in point of fact quite equal to that possessed by birds which actually accomplish a high degree of fecundity. Whether or not such high fecundity is actually realized evidently depends then upon the influence of additional factors beyond the anatomical basis. As has already been indicated in the preceding section it is reasonable to suppose that these factors are physiological in nature.

The Mechanism of the Inheritance of Fecundity as Measured by Winter Egg Production.

A study of numerous statistics shows that hens fall into three well-defined classes in respect to winter production. These classes include (*a*) those birds which lay no eggs whatever in the winter period (up to March of the laying year); (*b*) those that lay but have a production during the period of something under about 30 eggs; and finally (*c*) those whose production exceeds 30 eggs in the winter period. The division point between the two latter classes is not sharply defined in every case, but it is plainly at about 30 eggs in the case of the breeds and strains used in these experiments. Since in the analysis some fixed point must be taken for this boundary, a production of 30 has been chosen for this purpose and will be used throughout. This is an arbitrary choice only in the sense that it is a convenient round number lying very near where the biological division point falls, at least in the strains of domestic fowls used in these experiments. The analysis could doubtless be carried through nearly or quite as well by taking the division point at a production of 29 or 31, but 30 is a more convenient figure.

In making the division of winter egg production into three groups it must be remembered that this is a character subject to purely somatic fluctuations and environmental influence. Allowance for these factors must be made in interpreting and classifying results.

Turning now to the symbolic analysis we have to deal with three factors. These are:—

(1) An anatomical factor. This is basic. It consists in the presence of a normal ovary, the primary organ of the female sex. In the genetic analysis a separate letter need not be used for the designation of this factor, but instead it will be understood to be included in the letter denoting the presence of the female sex or its determiner. That is F will denote the presence of the ovary or the ♀ sex determiner. Then f will denote the absence of femaleness and the absence of an ovary. Obviously a separate letter is not needed for this "anatomical factor" since the presence of an ovary is the objective criterion of the existence of the female sex, and its absence of the existence of the male sex.

(2) The "first production" factor. This is the primary physiological factor which in coexistence with F makes the bird lay eggs during the winter period. Quantitatively it may be taken as determining a winter production of more than zero eggs and less than 30. The presence of this factor will be denoted by L_1.

(3) The "second production" factor. This is a second physiological factor, which in coexistence with F and L_1 leads to *high* fecundity. The presence of this factor will be denoted by L_2 and its absence by the corresponding small letter. When F and L_1 are present the addition of

L_2 makes a winter production of over 30 eggs. If F is present and L_1 absent the presence of L_2 leads to a winter production of under 30 eggs. Thus either L_1 or L_2 alone makes a record of under 30 eggs. They are independent determiners of this degree of production. It should be pointed out, however, that in spite of their equivalence in this regard the factors L_1 and L_2 are not qualitatively the same. That is, the increased production when L_1 and L_2 are both present, is not because there are present two "doses" of the same determiner. The proof of this is found in the fact that when there are two "doses" of L_1 present in a bird it does *not* make her a high producer. L_2 may be considered an excess production factor, which erects a superstructure on the foundation furnished by L_1. In the absence of L_1 it lacks the foundation from which to start and hence only can build about as high as L_1 would alone. Of course, it will be understood that in the presence of f (absence of female sex and ovary) these physiological fecundity factors L_1 and L_2 are simply latent.

Using the letters in the manner defined above, and with the usual Mendelian method of writing gametic and zygotic formulæ, the data indicate that there exist nine different types (in respect to fecundity) of Barred Plymouth Rock males, six types of Barred Plymouth Rock females, three types of Cornish Indian Game males, and three types of Cornish Indian Game females. The only point needing particular attention in reference to these formulæ is that the factor L_2, the excess production factor, behaves in inheritance as a *sex-limited* or *sex-correlated character*. It is apparently repelled by the female determiner F. It is thus like the barred pattern factor in the Barred Plymouth Rock fowl.* In consequence gametes of the type FL_2 are never formed.

Any gamete which bears F does not, under any circumstances, ever carry L_2. All females which carry the excess production factor L_2, are heterozygous in respect to it.

We have fecundity practically determined, then, by two physiological factors, one of which is sex-correlated in its inheritance and the other not.

The accordance between observed fact and theoretical expectation on this interpretation of the results is shown in the following tables which give the results of a portion of the actual experiments. As the experiments were rather extensive it is not possible here to present anything like the complete material. Only representative matings are here given. Table II. gives the results of some of the Barred Plymouth Rock by Barred Plymouth Rock matings in detail, in order to show, not only the accordance between observation and theory, but also the distinctness of the classes of fecundity segregated (shown by the *average* winter production in each segregated class).

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* cf. Pearl, R. and Surface, F. M. Arch. f. Entwick. Mech. Bd. XXX, pp. 45-61, 1910, and Science, N.S. Vol. XXXII, pp. 870-874, 1910.

Table II.

Showing some Results of Mating together Barred Plymouth Rock Males and Barred Plymouth Rock Females with different combinations of Fecundity Genes. Summarized Data.

Matings.	Distribution of daughters in respect to winter egg production.			
	Class.	Over 30.	Under 30.	Zero.
♂ $1L_1L_2$. fI_1I_2 × ♀ fL_1L_2 . FI_1I_2 (High producer)	Observed	21	30	8
	Expected	*22·1*	*29·5*	*7·4*
Average winter egg production in each class		48·85 eggs	16·34 eggs	0 eggs
♂ fL_1L_2 . fI_1I_2 × ♀ fL_1L_2 . FL_1I_2 (High producer)	Observed	21½*	16½	0
	Expected	*19*	*19*	*0*
Average winter egg production in each class		50·38 eggs	16·69 eggs	—
♂ fL_1L_2 . fI_1I_2 × ♀ ♀ of all types taken together.	Observed	51½	62½	11
	Expected	*51.45*	*62·5*	*11·05*
Average winter egg production in each class		47·94 eggs	15·34 eggs	0 eggs
♂ fI_1L_2 . fI_1L_2 × ♀ fL_1L_2 . FI_1I_2 (High producer)	Observed	92½	103½	7
	Expected	*101·5*	*101·5*	*0*
Average winter egg production in each class		54·19 eggs	15·52 eggs	0 eggs
♂ fI_1L_2 . fI_1L_2 × ♀ fL_1L_2 . FL_1I_2 (High producer)	Observed	111	6	0
	Expected	*117*	*0*	*0*
Average winter egg production in each class		56·47 eggs	20·33 eggs	—
♂ fI_1L_2 . fI_1L_2 × ♀ fL_1I_2 . FI_1I_2 (Low producer)	Observed	29	23	2
	Expected	*27*	*27*	*0*
Average winter egg production in each class		47·93 eggs	15·30 eggs	0 eggs
♂ fI_1L_2 . fI_1L_2 × ♀ ♀ of all types taken together.	Observed	243	149	10
	Expected	*255·5*	*146·5*	*0*
Average winter egg production in each class		53·67 eggs	15·37 eggs	0 eggs
♂ fL_1L_2 . fI_1L_2 × ♀ fL_1L_2 . FI_1I_2 (High producer)	Observed	20	6	3
	Expected	*21·75*	*7·25*	*0*
Average winter egg production in each class		56·90 eggs	24·17 eggs	0 eggs
♂ fL_1L_2 . fL_1I_2 × ♀ ♀ of all types taken together.	Observed	19	16	0
	Expected	*17·5*	*17·5*	*0*
Average winter egg production in each class		55·47 eggs	18·31 eggs	—
♂ fI_1L_2 . fI_1I_2 × ♀ ♀ of all types taken together.	Observed	8½	15½	5
	Expected	*10·25*	*14·5*	*4·25*
Average winter egg production in each class		60·50 eggs	12·26 eggs	0 eggs

* The records of ½ refer to birds whose winter production record was exactly 30 eggs. Each one of the few birds of this sort is divided between the "Over 30" and the "Under 30" classes.

From the data set forth in the above table there can be no doubt as to the fact of the Mendelian segregation of fecundity, nor as to the entire distinctness of the things segregated.

In order to give a general survey of the results, and to demonstrate the reality of segregation over the wide range of material included in the experiments, the summary Table III. is presented.

TABLE III.

Showing the Observed and Expected Distributions in Respect of Fecundity of the Adult Female Offspring from all Matings in each of the Classes Tested in the experiments.

MATINGS.	Winter Production of Daughters.			
	Class.	Over 30.	Under 30.	Zero.
All Barred Plymouth Rock × Barred Ply. Rock	Observed	365½	259½	31
	Expected	*381·45*	*257·25*	*17·30*
All Cornish Ind. Game × Cornish Ind. Game	Observed	2	23	15
	Expected	*0*	*25*	*15*
All F_1 (B. P. R. × C. I. G. and reciprocal cross)	Observed	36	79	8
	Expected	*26·5*	*86·75*	*9·75*
All F_2 (F_1 × F_1, and F_1 × parent forms in all possible combinations)	Observed	57½	98½	23
	Expected	*68·60*	*95·00*	*15·40*

Considering the nature of the material and the character dealt with the agreement shown between observation and hypothesis is certainly as close as could reasonably be expected. Such discrepancies as are shown in the above table are fully discussed and their probable physiological explanations set forth in detail in the complete account of these experiments.

The detailed data given in the complete paper, of which the above discussion and tables *give merely a very incomplete abstract*, appear definitely to establish the following points :—

1. That fecundity, in the domestic fowl, is inherited strictly in accordance with Mendelian principles.

2. That observed individual variations in fecundity here depend upon two separately inherited physiological factors, L_1 and L_2.

3. That *high* fecundity is manifested only when both of these factors are present together in the same individual.

4. That either of these factors when present alone, whether in homozygous or heterozygous form, causes about the same degree of *low* fecundity to be manifested.

5. That one of these factors, namely L_2, is sex-limited or sex-correlated in its inheritance, in such way that in gametogenesis any gamete which bears the female sex determinant F does not bear L_2.

6. That there is a definite and clear-cut segregation of high fecundity from low fecundity, in the manner set forth above.

These conclusions are fully and independently substantiated by long-continued breeding experiments involving the breeding together of (1) Barred Plymouth Rock males and females (a breed of generally high fecundity), (2) Cornish Indian Game males and females (a breed of generally low fecundity), (3) the F_1 and F_2 offspring from reciprocal crosses of Barred Plymouth Rocks and Cornish Indian Games and all possible matings *inter se* and with the parent forms of the cross-bred F_1 and F_2 offspring.

While these results may have no direct eugenic bearing, they do, I believe, have an important indirect connection with eugenic problems. In the first place, these results furnish a novel conception of the mode of inheritance of fecundity. They show that this highly variable physiological character is inherited in accord with simple Mendelian principles. They further show that simple selection of highly fecund females alone is not sufficient to ensure high fecundity in the race.

From the eugenic standpoint they suggest, though of course they do not prove, that possibly some part of the observed decline in human fecundity in highly civilized races may be due to the dropping out or loss of one or more of the genes upon which high fecundity depends, this loss being coincident with the complete cessation of the natural selection of highly fecund types.

Finally, these results on fecundity in fowls not only emphasize the importance of analytical studies to determine the precise mode of inheritance of human fecundity, but they also furnish a guide and stimulus for the conduct of such studies. If, as is the actual fact, it can be shown that in one animal belonging to the same great phylum to which man himself belongs (the vertebrate) fecundity is inherited in simple Mendelian fashion, it encourages one to hope that sometime a solution of the same problem may be reached for man. It at least points the way to a mode of attacking this complex problem which gives greater promise of leading ultimately to a solution than does any method which has hitherto been applied to it.

LA PSICOLOGIA ETNICA E LA SCIENZA EUGENISTICA.

Tema: "*Persistenza e variazione dei caratteri di Razza, particolarmente in riguardo alla Psicologia etnica.*"

PROF. ENRICO MORSELLI.

Direttore della Clinica per le Malattie mentali e nervose nella R. Università di Genova (Italia).

Le conclusioni del rapporto dal Prof. Enrico Morselli (di Genova) sono le seguenti:

(I.) Comunque si intendano e si classifichino gli aggruppamenti naturali e sociali della Umanità in senso etnologico, ogni cultore della Scienza antropologica deve ammetere il principio tassonomico che tutte le varietà naturali o razze umane non si differenziano soltanto per i loro *caratteri fisici*, ma altresì per quelli *mentali*.

(II.) Anche se noi non sappiamo ancora trovare le espressioni esatte per definire e per valutare le capacità intellettuali, le disposizioni affettive, il carattere e le tendenze attive di ciascuna razza, ciò non toglie che debba esistere una *Psicologia etnica*, parallela alla Somatologia etnica: pertanto una completa Scienza antropologica è quella che si propone il cómpito di descrivere, distinguere e classificare le razze e popolazioni umane sulla base di ambedue i lati inscindibili della personalità umana, cioè sul fisico e sul morale.

(III.) I caratteri psicologici delle Razze ubbidiscono alle stesse leggi che governano quelli somatici: perciò essi sono, o caratteri in parte originarî, correlativi alla *struttura primordiale* di ciascun tipo etnico, o caratteri in parte acquisiti mediante *l'adattamento*. I fattori che agiscono per adattare la mentalità di una razza e di un popolo alle sue condizioni di vita, sono di ordine complesso: alcuni dipendono dalla sua situazione spaziale, altri si confondono con la storia della stessa razza e popolazione in relazione colle altre, vicine o lontane, stazionarie o migrantí.

(IV.) Tutti i caratteri di una razza o varietà umana *persistono* finchè dura il suo adattamento mesologico; *variano* col modificarsi delle sue condizioni di vita. Quindi gli spostamenti spaziali, o forzati o volontarî, e le relazioni con le altre razze sono le cause delle modificazioni e trasformazioni cui soggiaciono i tipi etnici nei tempi storici, fatta astrazione dagli effetti assai più lenti dei mutamenti geofisici e geografici.

(V.) Esiste una *gerarchia* delle varietà e razze umane, sia sotto il punto di vista statico della loro morfologia e psicologia, sia sotto quello dinamico della loro predominanza e della loro dissoluzione nelle *unioni miste*; sono sempre le razze biologicamente più forti e psicologicamente più evolute,

quelle che imprimono i loro caratteri ai discendenti da codeste unioni. Questo fatto rende difficile la formazione di razze veramente meticcie (o ibride): il metamorfismo dei tipi etnici va inteso in senso molto ristretto.

(VI.) Un certo grado di *differenza* fra le varietà o razze madri è necessario per la vitalità e la prosperità delle popolazioni miste o metamorfiche: però una differenza troppo grande, oltre a rendere più difficile le unioni per ragioni morali più che per ragioni fisiche, riesce sempre dannosa ai discendenti, tanto nei riguardi del fisico, quanto del mentale.

(VII.) Le *unioni miste* esercitano sui caratteri mentali di razza gli stessi effetti che si scorgono in quelli somatici: (*a*) nei discendenti si avvera la semplice *mescolanza* delle capacità, attitudini, tendenze psichiche delle razze-madri; (*b*) può avvenire la *combinazione* dei caratteri medesimi, con la formazione di qualità mentali medie; (*c*) vi sono talvolta caratteri psichici di una razza che diventano *dominanti* secondo la nota "legge di Mendel."

(VIII.) Essendo ogni razza, ogni popolo, ogni nazione il prodotto di un adattamento, sia per azione dei fattori esterni, sia per conseguenza delle vicende storiche, tutti gli aggruppamenti etnici si svolgono, vivono, prosperano e si estinguono in ragione delle stesse leggi che regolano le sorti degli altri esseri viventi; tutti hanno il loro *destino* segnato dal gradino cui sono giunti nella gerarchia fisio-psichica umana.

(IX.) Bisogna che ogni razza o popolazione o nazione, quando ha acquistata la consapevolezza e il sentimento dei proprî caratteri distintivi, e della parte che le spetta nello sviluppo della Civiltà universale, si proponga la *conservazione del proprio tipo etnico*: il differenziamento dei popoli è una delle cause, se pur non è la prima, del progresso nella Evoluzione umana.

(X.) La scienza Eugenistica, che ha per fine precipuo di stabilire i mezzi per perfezionare la specie, non deve mirare soltanto alla realizzazione di un tipo uniforme di *Homo*: deve invece variare i suoi intenti pratici a seconda del naturale *differenziamento* operatosi fra le razze e fra le nazioni durante il processo bio-storico.

(XI.) Nell'insieme delle sue varietà la *Umanità futura* sarà senza dubbio molto superiore alla attuale fisicamente e mentalmente, come questa lo è rispetto all'antica: però il generale miglioramento della specie non deve portare alla eguaglianza degli uomini, nè a quella delle razze e delle nazioni. Ciascuna di esse ha il suo cómpito particolare nella Storia, quale viene determinato dalla sua situazione nello spazio, dai suoi rapporti coll'ambiente, dalle sue vicende, dai prodotti della sua mentalità speciale, dalle sue stesse idealità e dal suo stesso concetto della vita.

(XII.) In sostanza, secondo il Relatore, le generazioni future, pure acquistando caratteri sempre più specifici dal punto di vista del tipo umano, non dovrebbero mai distruggere nè perdere quelli che sono acquisti di adattamenti particolari alle diverse loro condizioni locali di esistenza.

Quando fosse divenuto possibile creare ed applicare una scienza Eugenistica universale, cioè comune a tutti i popoli civili, ciascuno di questi dovrà segnare le linee direttive di una Eugenistica etnologica, che abbia di mira la *difesa* e la *propagazione del proprio tipo fisico* sempre più differenziato e della *propria mentalità* sempre più caratteristica. Come fra gli individui il successo nella vita è assicurato soltanto a quelli che meglio sanno formarsi e mantenere una propria personalità, così, fra le nazioni e le razze, le più vitali e dominanti saranno sempre quelle che si creeranno e si conserveranno gelosamente un tipo proprio di struttura e di coltura, imparando a regolarne la propagazione nelle unioni sessuali.

ETHNIC PSYCHOLOGY AND THE SCIENCE OF EUGENICS.

Subject: "*The Persistence and Variation of Racial Characters especially in Relation to Ethnic Psychology.*"

PROF. ENRICO MORSELLI,

Director of the Clinic for Mental and Nervous Diseases in the Royal University, Genoa, Italy.

The conclusions of the contribution of Professor Enrico Morselli, of Genoa, are as follows:—

(i.) However the natural and social groupings of man are understood and classified in the ethnological sense, every student of anthropological science must admit the principle that all varieties and races of man vary not only in their physical, but also in their mental characters.

(ii.) Also, if we cannot yet find the exact expression to define and estimate the intellectual capacities, the feelings and dispositions, the characteristics and the active tendencies of each race, that fact does not invalidate the conclusion that there must be an Ethnic Psychology, parallel to the Ethnic Somatology: nevertheless, a complete Science of Anthropology is that which proposes the task of describing, distinguishing, and classifying the human races and populations upon the basis of both the inseparable sides of human personality, *ie.*, the physical and the moral.

(iii.) The psychological characters of races obey the same laws which govern their bodily characters: therefore there are characters in part original, corresponding to the primordial structure of each ethnic type, and characters in part acquired through the agency of adaptation. The factors which operate to adapt the mentality of a race or a people to its conditions of life

are of a complicated order; some depend upon its position in space, others are mixed up with the history of the same race and population in relation with other races.

(iv.) All the characters of a human variety or race persist as long as its mesological adaptation lasts. They vary with the modification of its conditions of life. Hence, the displacements in space, whether forced or voluntary, and the relations with other races are the causes of the modifications and transformations to which ethnic types are subjected in historic times, deduction being made for the slower effects of physical and geographical changes.

(v.) There is a hierarchy of the human varieties and races, whether from the static point of view of their morphology and psychology, or from the dynamic point of view of their predominance and their dissolution in mixed unions. It is always the races strongest biologically and most evolved psychologically which impress their characters upon the descendants of these unions. This fact renders difficult the formation of truly mongrel or hybrid races. The metamorphosis of ethnic types is understood in a very restricted sense.

(vi.) A certain degree of difference amongst the parent varieties or races is necessary for the vitality and the prosperity of mixed or metamorphic populations: nevertheless, too great a difference, besides rendering unions more difficult for moral rather than for physical reasons, proves always injurious to the descendants as much in physique as in mind.

(vii.) Mixed unions exert the same influences upon the mental characters of race as can be observed in bodily characters: (*a*) In the descendants will be found the same mixture of the capacities aptitudes and psychical tendencies of the parent races; (*b*) a combination may occur of the same characters with the formation of intermediate mental qualities: (*c*) there are sometimes psychical racial qualities which become "dominant" according to the well-known "law of Mendel."

(viii.) Every race, people, and nation, being the product of an adaptation, whether through the action of external factors, or in consequence of its historic vicissitudes, all ethnic groupings develop, live, prosper, and disappear according to the same laws which regulate the fortunes of other living beings; all have their destiny marked out by the stage to which they have attained in the psycho-physical hierarchy of man.

(ix.) It is needful that every race, or population, or nation, when it has acquired the consciousness and the feeling for its own distinctive characters and of the part which awaits it in the development of universal civilisation, should contemplate the preservation of its own ethnic type. The differentiation of peoples is one of the causes, if however not the chief cause, of progress in human evolution.

(x.) The Science of Eugenics, which has for its chief end the establishment of means for bringing the species to perfection, ought not to look only

to the realisation of a uniform type of man: on the contrary, it ought to vary its practical efforts according to the natural differentiation of work amongst races and nations during the bio-historical period.

(xi.) In the totality of its varieties, the Humanity of the future will be without doubt much superior physically and mentally to the present Humanity, as this is superior in regard to that of ancient times: therefore, the general improvement of the species should not aim at the equalisation of men nor at that of races or nations. Each of these has its particular task in History, which is determined by its place in space, by its relation to the environment, by its experiences, by the products of its special mentality, by its ideals, and by its conception of life.

(xii.) In actual fact, according to the reporter, future generations, while acquiring characters always more specific from the point of view of the human type, should never destroy nor lose those characters acquired by special adaptations to their diverse local conditions of existence.

When it shall have become possible to create and apply a universal science of Eugenics, *i.e.*, common to all civilised peoples, each of these should mark the directing lines of an ethnological Eugenics which should keep in view the defence and the propagation of its proper physical type, always more differentiated, and of the proper mentality, always more characteristic. As amongst individuals, success in life is assured only to those who best know how to form and maintain a proper personality, so amongst nations and races, the most vital and the most dominant will always be those who will create and jealously preserve a proper type of structure and culture, learning how to regulate propagation in sexual unions.

THE INHERITANCE OF EPILEPSY.

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In the preparation of this paper for the First International Eugenics Congress, I have endeavoured to bring our study to date, and have therefore borrowed from and will include in this paper the 177 pedigrees studied by Dr. C. B. Davenport and the writer in our joint paper, "A First Study of the Inheritance of Epilepsy."

In this study we have classified as epilepsy not only those cases of well marked convulsions, but also cases in which there has been only momentary loss of consciousness. In the somewhat hurried investigation into the pedigrees of our patients, we have undoubtedly overlooked less marked cases of epilepsy and various border-line cases.

With epilepsy thus defined, we have endeavoured to learn what laws, if any, are followed in its return to successive generations; how often it arises *de-nova* in strains which show elsewhere no mental weakness; what relation it bears to alcoholism, migraine, paralysis, and other symptoms of lack of neural strength.

Until recently it has been considered sufficient to determine the known number of epileptic ancestors or other relatives of a case of epilepsy, and then take this proportion as the index of heredity, with the natural result that the index increased as the study of the family was extended, resulting in a difference of from 20 to 75 per cent., as determined by different workers.

In our study of the inheritance of epilepsy, we have endeavoured to analyze our data by the Mendelian method, which assumes that the inheritance of any character is not from the parents, grandparents, etc., but from the germ plasm out of which every fraternity and its parents and other relatives have arisen.

The relation of soma and germ plasm is as follows:—

1. If the soma possesses a trait of the recessive to normality sort, it lacks the unit character upon which normal development depends, and it is primâ facie evidence that the representative of that character is absent from its germ plasm; consequently such a person cannot transmit the character in question. The condition in the case when the determiner is absent may be called nulliplex.

2. If the soma possesses a trait of the dominant to normality sort, it is evidence that the germ plasm has the corresponding determiner. But either one of two conditions is possible: (a) The determiner was derived from both parents, so that it is double in the germ plasm, or duplex, and all the germ cells have the determiner; or else (b) it came from one parent only, in which case it is single in the germ plasm, or simplex, and half of the germ cells have and half lack the determiner.

A moment's consideration will show that six kinds of gametic matings, disregarding sex, are possible. These matings, together with the sort of conceptions they may be expected to yield, are as follows:—

I.	Nulliplex × Nulliplex	=	100% Nulliplex — without the character for full mental development.
II.	Nulliplex × Simplex	=	50% with character Nulliplex; 50% with it Simplex.
III.	Nulliplex × Normal	=	100% with character Simplex.
IV.	Simplex × Simplex	=	25% with character Nulliplex, 50% with it Simplex; 25% with it Normal.
V.	Simplex × Normal	=	50% with character Simplex; 50% with it Normal.
VI.	Normal × Normal	=	100% Normal—mentally strong.

Practically, it is not always easy to distinguish the simplex from the normal condition, although frequently a simplex condition is indicated by an *intermediate* mental status.

The method of obtaining our material, through the medium of field work, is largely responsible for any advance which has been made in our study of the Inheritance of Epilepsy.

The field workers visit the parents and other relatives of the patient and interview them in their homes, where they are at ease and free from restraining influences, as would not be possible elsewhere. The family physician, clergyman, school teacher, and other interested persons are also interviewed for the purpose of securing an accurate account of the mental status, environmental conditions, diseases, and causes of death, if dead, of as many relatives of the patient as possible.

The data thus obtained is put in permanent form on a chart, and with the written heredity history is filed with the other records of the case. On a heredity card the data is recorded and tabulated, in such a manner that future additions and corrections can be easily made without destroying or detracting from the work done to date. An index of the names of individuals charted facilitates the tracing of families from one pedigree to another. (See pages 79 and 80, form for written description of the chart and Heredity Card.)

A cross index of place, name and trait helps to locate the defective strain by family name, defect, and locality. A reference index is also kept of relatives living in different counties, states or foreign countries, together with the name and location of any institutions in which they have been treated. In connection with the heredity work a register kept by counties shows the name, age, institution, or other care received, no care, etc., of every epileptic in the state known to us. (See page 80, Registration Card.)

It will be easily understood how data thus obtained has proved to be much more significant and trustworthy than the familiar family history obtained from the patient or his guardians at the time of his admission to the institution, and, we are convinced, justifies careful study, which is more than can be said of the former history.

MATERIAL.

For this study the material consists of the histories obtained for 397 patients; there are, however, only 388 different family histories; that is, the 397 patients come from 388 different fraternities. In one case there are four patients from the same fraternity; and in another there are three from the same fraternity, and in this case the mother is also a patient; and in four other cases there are two from the same fraternity. Besides these, four other patients have been found to be related, and the frequency with which the same name occurs on many of the charts indicates without a

doubt that several others are related. These relationships may in time be established by the field workers.

In the detailed study in the seven tables which follow, 31 of the histories were not considered because there seemed to be too much doubt as to the exact mental status of one or both of the parents. In addition, however, to the 357 principal matings considered, 83 secondary matings were used, making the total number of fraternities studied 440.

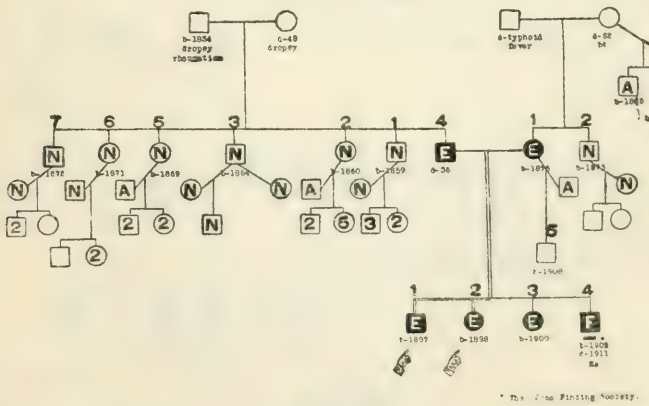
The total number of epileptics recorded on the charts was 756, which was 3% of the total chart population of 21,558, or 9% of the 8,698 classified individuals. The 397 patients studied ranked in line of birth from one to nineteen; 236, or nearly 60%, ranked before fourth in line of birth. (Table X.) Only 30% came from bad surroundings and poverty-stricken homes where they had no proper care, which would seem to confirm the theory that epilepsy is inherited and not due to environment.

In analyzing our data, we have classified it under the six kinds of matings, as follows:—

Nulliplex × Nulliplex.

There are 27 fraternities in which both parents are either epileptic or feeble-minded. Sixteen of these matings are principal matings and 11 secondary matings. (Table I.)

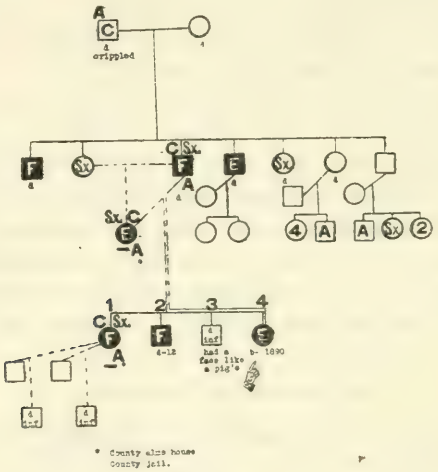
In three of the matings both of the parents were epileptic. Of the 28 conceptions, two were still-births, three miscarriages, three died before two years of age, and one (an infant) is too young for classification, leaving 19 about whom something definite is known. Of these, eight were epileptic, three feeble-minded, and eight, who came from parents who developed epilepsy late in life, were tainted. (Fig. 1.)



Case 3667.

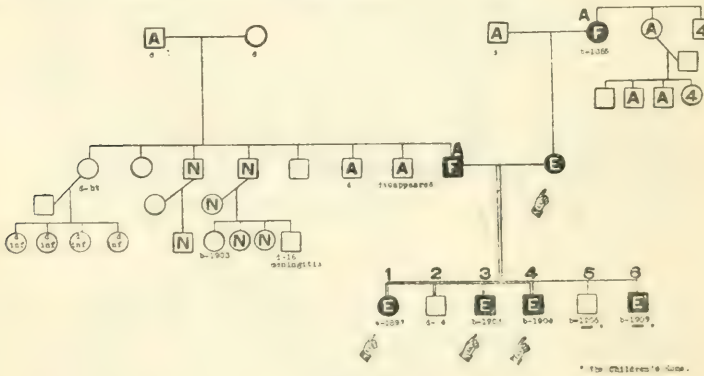
Fig. 1.—The principal mating in this case is of two epileptics, who had four children, three of whom are epileptic and one feeble-minded. Since the death of the father the mother has married an alcoholic man, and has had one child. E, epileptic; F, feeble-minded; A, alcoholic; N, normal; d, died; b. born.

In the 15 fraternities in which one parent is epileptic and the other feeble-minded there were 81 conceptions; seven were too young to be classified and 19 died before 14 years of age. Of the 55 classified, 28 were epileptic, 26 feeble-minded, and one insane. (Fig. 2, 3, 4, 5, 6.)



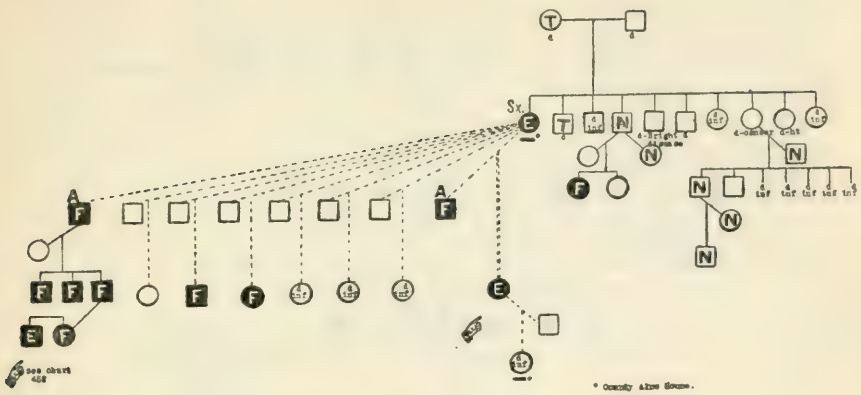
Case 3162.

Fig. 2.—This is a case of incest. A feeble-minded man had by his defective sister an epileptic daughter, then by this daughter he had four children, one an epileptic, one a feeble-minded woman of the streets, who spends much of her time in jail, one an anencephalic monster, who died soon after birth, and one a feeble-minded boy, who did not grow to manhood. "The empty germ plasm yields only emptiness." This family lived in a hut in the woods until it was burned down, and now the mother and daughter, when not in jail, live in a cellar in town. E, epileptic; F, feeble-minded; C, criminalistic; Sx, sexually immoral; A, alcoholic; d. inf, died in infancy; . . . . illegal union.



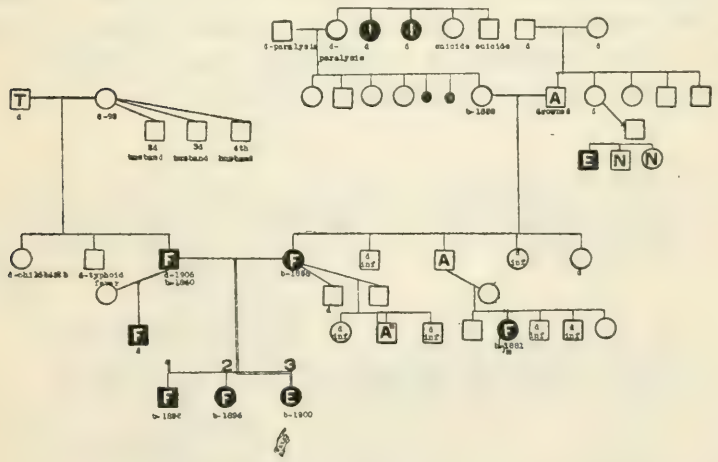
Case 5412.

Fig. 3.—The wife in the central mating here illustrated is a low grade patient at the New Jersey State Village for Epileptics; the husband is an alcoholic feeble-minded man. Of the six children resulting from their union, one died at the age of four. All the others, with the exception of No. 5, whose epilepsy is in doubt, are epileptic, three of them being patients at "The Village." This family lived in a cellar, slept on rags and depended on the neighbours for food. E, epileptic; F, feeble-minded; A, alcoholic; N, normal; d, died; b, born.



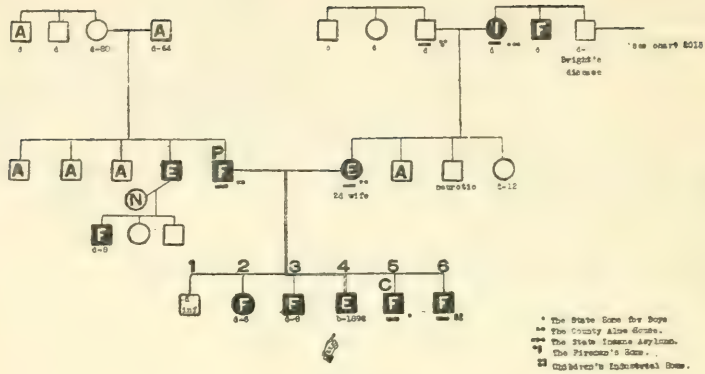
Case 586.

Fig. 4.—The central figure on this chart is an epileptic woman, who has spent much of her life in the almshouse. No two of her seven children are by the same father. The epileptic daughter (now a patient at "The Village"), whose father was a feeble-minded alcoholic man, had started to lead the same unchaste life as her mother. In the almshouse she had given birth to one illegitimate child before she was placed under state care. The mother, when she last left the almshouse, went to live in a hut in the woods with a feeble-minded man, who had three feeble-minded sons. One of these sons married the feeble-minded sister of one of the epileptic patients at "The Village." E, epileptic; F, feeble-minded; N, normal; T, tubercular; d, died; b, born; . . . . illegal union.



Case 4172.

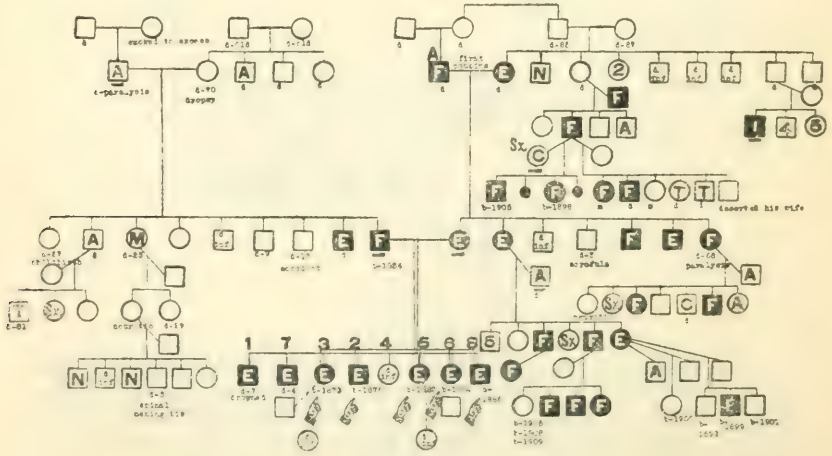
Fig. 5.—The central mating in this chart is of a feebleminded man and a feeble-minded woman, each of whom was married more than once. The three children resulting from this union were all defective, two feeble-minded and one epileptic. The mother's relatives show a history of insanity, suicide, and epilepsy. E, epileptic; F, feeble-minded; A, alcoholic; I, insane; N, normal; d, died; inf, infancy.



Case 4369.

Fig. 6.—There were six children from this union. One died in infancy, four were feeble-minded, and one epileptic. Of the three now living the epileptic is a patient at The New Jersey State Village for Epileptics, one feeble-minded boy showed criminalistic tendencies and is an inmate of the State Home for Boys, the other feeble-minded boy is at the Children's Industrial Home. The epileptic mother and the feeble-minded father are in the county almshouse, supported by the town. The mother's mother died in the State Hospital for the Insane; the mother's father died in the Firemen's Home. E, epileptic; F, feeble-minded; A, alcoholic; I, insane; N, normal; Ne, neurotic; b, born; d, died; P, paralytic.

In nine fraternities in which both parents were feeble-minded, there were 56 conceptions. Of these, 4 died before two years of age, 14 were too young for classification. Of the other 38 of whom something definite is known, 7 were epileptic, 29 feeble-minded, and 2 drunkards, who may or may not have been feeble-minded. (Fig. 7.)



Case 597.

Fig. 7.—This chart illustrates a history of many defectives, whose children have added to the community's burden. The principal mating is that of an epileptic woman, descendant of an epileptic mother and a feeble-minded father, who were first cousins, married to a feeble-minded man, one of whose brothers was epileptic and one migranous. They had eight children, one died before two years of age, all of the others (seven) were epileptic. The five now living are being cared for at the New Jersey State Village for Epileptics. Two of the girls had illegitimate children before they came under the care of the proper authorities. The mother of this family was one of seven children, two of whom died in infancy. Of the other five, three were epileptic and two feeble-minded, the two sisters had only defective offspring. E, epileptic; F, feeble-minded; I, insane; N, normal; C, criminalistic; A, alcoholic; T, tubercular; M, migrainous; Sx, sexually immoral; d, died; b, born; inf, infancy.

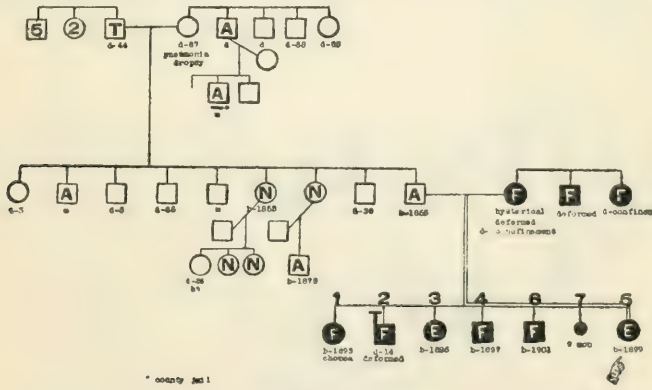
These matings of the type nulliplex by nulliplex seem to justify the expectation that all children from these unions will lack the determiner for normality.

In five fraternities where one parent is insane and the other epileptic or feeble-minded, there were 29 conceptions. Five died before 14 years of age, two unknown. Of the 22 available for study 2 are epileptic, 4 feeble-minded, one insane, 8 tainted, and 7 seemingly normal. These latter came from two fraternities, where in one case the father's insanity seemed to be traumatic and in the other alcoholic. (Table Ia.)

Nulliplex × Simplex.

Under this classification we have grouped separately those fraternities in which one parent was alcoholic.

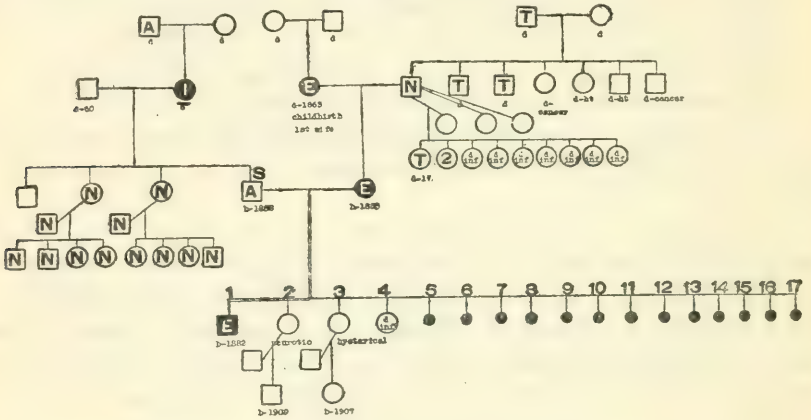
In the consideration of the fraternities where one of the parents is epileptic or feeble-minded, and the other alcoholic, we have classed as alcoholic all of those parents who are habitually hard drinkers, or who go on frequent sprees.



Case 2645.

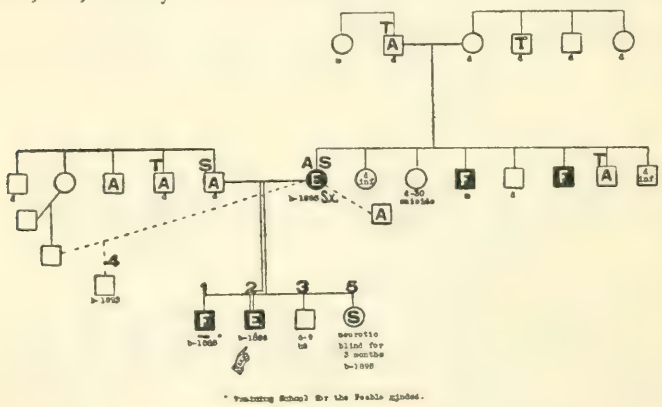
Fig. 8.—The principal mating in this chart is of an alcoholic man to a feeble-minded woman, whose brother and sister are feeble-minded. All of their children are defective, two epileptics and four feeble-minded. The epileptic girl who is not under state care is a masturbator and has shown some criminalistic tendencies. All of the children are dependent on relatives for support. E, epileptic; F, feeble-minded; T, tubercular; A, alcoholic.

In 35 fraternities there were 226 conceptions. Twenty-one are yet too young to be classified, 79 died before 14 years of age (which is 35%, a high death rate). Of the 126 remaining, 39 are epileptic, 38 feeble-minded, and 28 show some other taint (one insane, three migrainous, 16 neurotic, 5 alcoholic, and 3 sexually immoral), with only 21 apparently normal. (Table II.) (Figs. 8, 9, 10, 11, see page 69 for Fig. 8.)



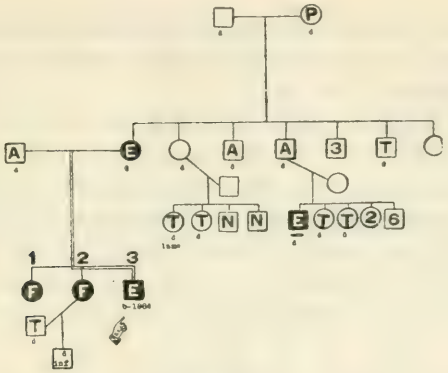
Case 1772.

Fig. 9.—This chart shows an epileptic woman, descended from an epileptic mother and married to an alcoholic syphilitic man, whose mother was insane. Their first child was epileptic, the next two neurotic, the fourth died in infancy, and following these were thirteen miscarriages. On this same chart are two normal women married to normal men, whose children were all normal. E, epileptic; I, insane; A, alcoholic; N, normal; S, syphilitic; Sx, sexually immoral; Ne, neurotic; T, tubercular; d, died; b, born; inf, infancy.



Case 2086.

Fig. 10.—The epileptic mother of the principal fraternity, is a most repulsive unchaste woman. She is content to live in filth and stand the abuse of the drunken man with whom she lives, providing she has what whiskey she wants. The four children which she had by her drunken syphilitic husband were all defective. One died at nine years of age, one is feeble-minded, one is epileptic, one, a girl, is syphilitic. She is also the mother of an illegitimate child by her husband's nephew. In her family are two feeble-minded brothers, one brother a drunkard, and a sister who committed suicide. E, epileptic; F, feeble-minded; S, syphilitic; A, alcoholic; T, tubercular; Sx, sexually immoral.

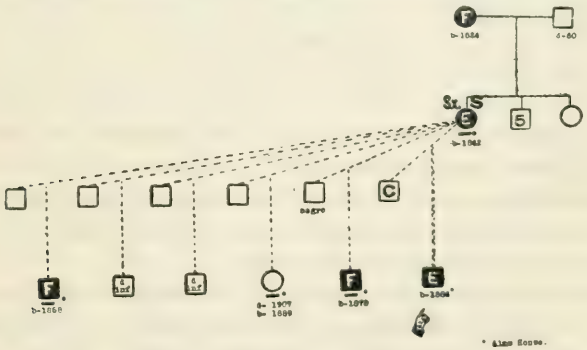


Case 2601.

Fig. 11.—The father of the principal fraternity is alcoholic and the mother epileptic. Nothing is known about the father's relatives. The mother had an epileptic nephew and two alcoholic brothers. The one epileptic and two feeble-minded children from this union would seem to indicate that the mating was of the type nulliplex by nulliplex, rather than simplex by nulliplex. E, epileptic; F, feeble-minded; I, insane; T, tubercular; P, paralytic.

In these matings of the type nulliplex × simplex, we should expect 50% nulliplex, that is, epileptic or feeble-minded, and 50% simplex, that is, apparently normal or showing only some slight defect. We have, however, 61% nulliplex, 39% simplex, the increase over the expectation being probably due to the fact that the alcoholic parent was also mentally defective, or that the alcoholism may, through the poisoning of the germ cells, be a contributing cause of epilepsy.

In addition to the above there were six matings where one parent was insane and the other alcoholic. Of the 29 conceptions, nine died in infancy,



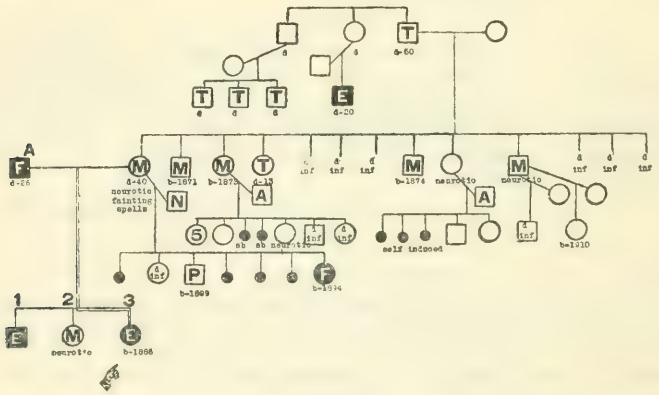
Case 825.

Fig. 12.—This chart again illustrates the source of almshouse inmates. The epileptic woman, who descended from a feeble-minded mother and a worthless father, has spent a large part of her life in the almshouse, and all of her children have been inmates. No two of them have the same father. One is by a negro, two died in infancy, one, of whom little is known, died at 18 years of age. Of the others, two are feeble-minded, one, whose father was criminalistic, is an epileptic imbecile and a patient at the New Jersey State Village for Epileptics. E, epileptic; F, feeble-minded; A, alcoholic; Sx, sexually immoral; S, syphilis; C, criminalistic; d, died; b, born.

six are unclassified, leaving 14 of whom something definite is known. Of these, 7 were epileptic, 3 feeble-minded, 2 neurotic, and 2 apparently normal. (See page 82, Table IIa.)

In considering the fraternities in which one of the parents is either epileptic or feeble-minded, and the other tainted, we have classified as "tainted" the migrainous, neurotic, and those who are mentally weak.

There were 25 fraternities with 161 conceptions. Sixty died before 14 years of age, 24 are too young for classification, leaving 77 for study. Of these, 27, or 35%, are epileptic; 9, or 11%, feeble-minded; 24 show some slight nervous or mental weakness, and 17 normal. (See page 83, Table III.) (Figs. 12, 13.)



Case 5016.

Fig. 13. This chart illustrates the union of a feeble-minded alcoholic man (the history of whose ancestors is unknown), and a migrainous woman whose three brothers and sisters were also migrainous), resulting in three children, two of whom are epileptic and one migrainous. A second marriage of this migrainous woman to an apparently normal man, resulted in seven conceptions. One died in infancy, one paralytic, one feeble-minded and four miscarriages. E, epileptic; F, feeble-minded; M, migrainous; A, alcoholic; P, paralytic; N, normal; T, tubercular; b, born; d, died.

In these matings we should expect 50% nulliplex and 50% simplex. We obtained 47% mentally defective and 53% apparently normal, or showing some slight weakness, which is a very close fitting to the expectation. The discrepancy may be accounted for by the possible classification as simplex of individuals who are in reality nulliplex.

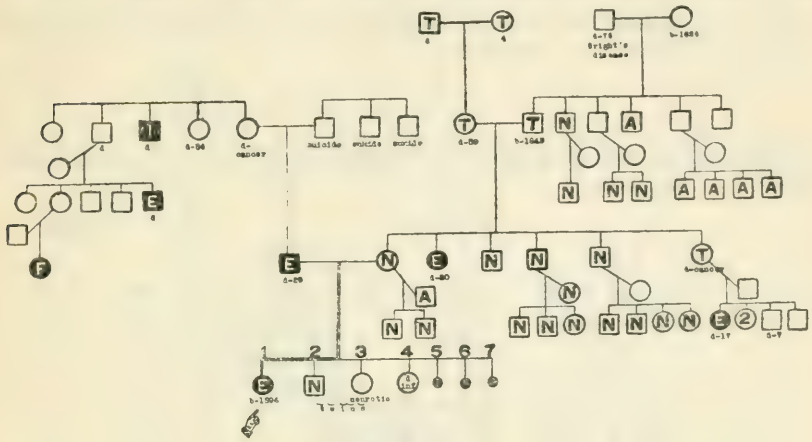
In six matings of an insane parent with a "tainted" one, there were 45 conceptions; 10 died in infancy. 9 are unclassified. Of the 26 others, 9 were epileptic, none feeble-minded, 8 tainted, with 9 apparently normal. (See page 83, Table IIIa.)

NULLIPLEX × NORMAL.

Under this classification we have tried to place the fraternities of which one parent was epileptic or feeble-minded, and the other reported normal.

In 38 fraternities with 223 conceptions; 62 died in infancy, 36 are too young for classification. Of the 125 others 39, or 32%, are epileptics; 14,

or 11%, are feeble-minded; and 26, or 21%, are neurotic; while 46, or 39%, were apparently normal. (See pages 84, 85, Table IV.) (Fig. 14.)



Case 2819.

Fig. 14.—In this case the central mating is of an epileptic man with an apparently normal woman (who is probably simplex, as she had an epileptic sister). Of the seven conceptions three were miscarriages, the first child an epileptic, the next two were twins, one of whom is normal and the other neurotic, and the last child died before it was two years of age. In the matings of normals on this chart it will be noticed that all of the children are normal, they may be either duplex or simplex. E, epileptic; F, feeble-minded; I, insane; A, alcoholic; T, tubercular; N, normal; b, born; d, died.

This fitting conforms very closely with what might be expected from the type simplex by nulliplex, indicating that the parents who have been classified as duplex (normal) are really simplex, in that half their germ cells have and half lack the determiner for normality.

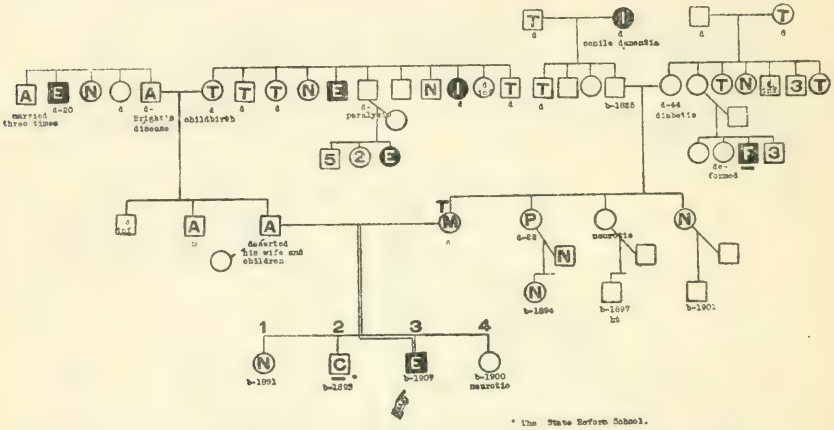
From a study of Table A., it is evident that 20 of the normal parents had ancestors who showed some mental or nervous weakness. This would justify their classification as simplex. In 26 cases little is known about the ancestors of the normal parent. The available information about three would indicate that they are mentally normal. Judging from their offspring, we believe that subsequent data will show that those apparently mentally normal parents descended from tainted ancestors.

Eleven matings of an insane and normal parent resulted in 50 conceptions; 10 died before 14 years of age, 7 are too young for classification. Of the 33 remaining, 12, or 36%, were epileptic; 2, or 6%, feeble-minded; 18, or 55 per cent., seemingly normal; while 1, or 3%, was neurotic. (See page 85, Table IVa.)

Simplex × Simplex.

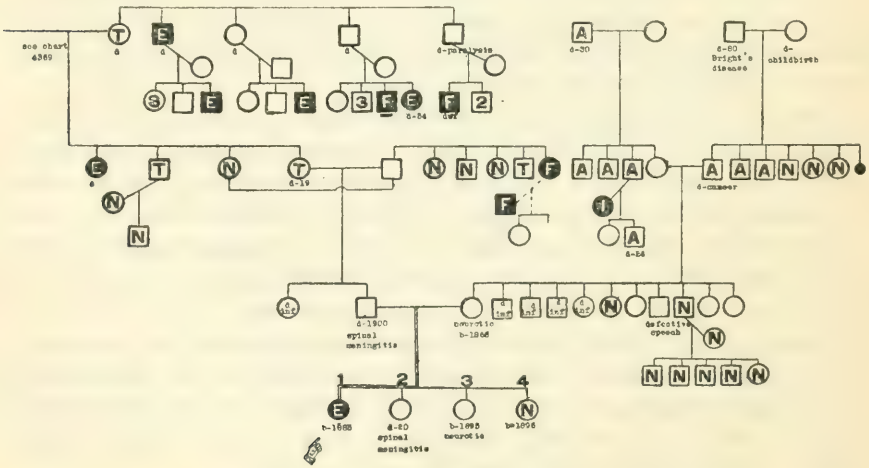
Under this type of matings we have grouped those fraternities coming from matings where neither parent can be classified as normal, or called mentally deficient, but showing some mental or nervous weakness.

There were 84 matings of this type, with a total of 540 conceptions. One hundred and fifty-two died in infancy, with 52 unclassified. Of the 336 others, 97 were epileptic and 17 feeble-minded; in other words, 114, or 35%, were nulliplex, an excess of 10% over the expected 25%. (See page 86, Table V.) (Figs. 15, 16, 17, 18.)



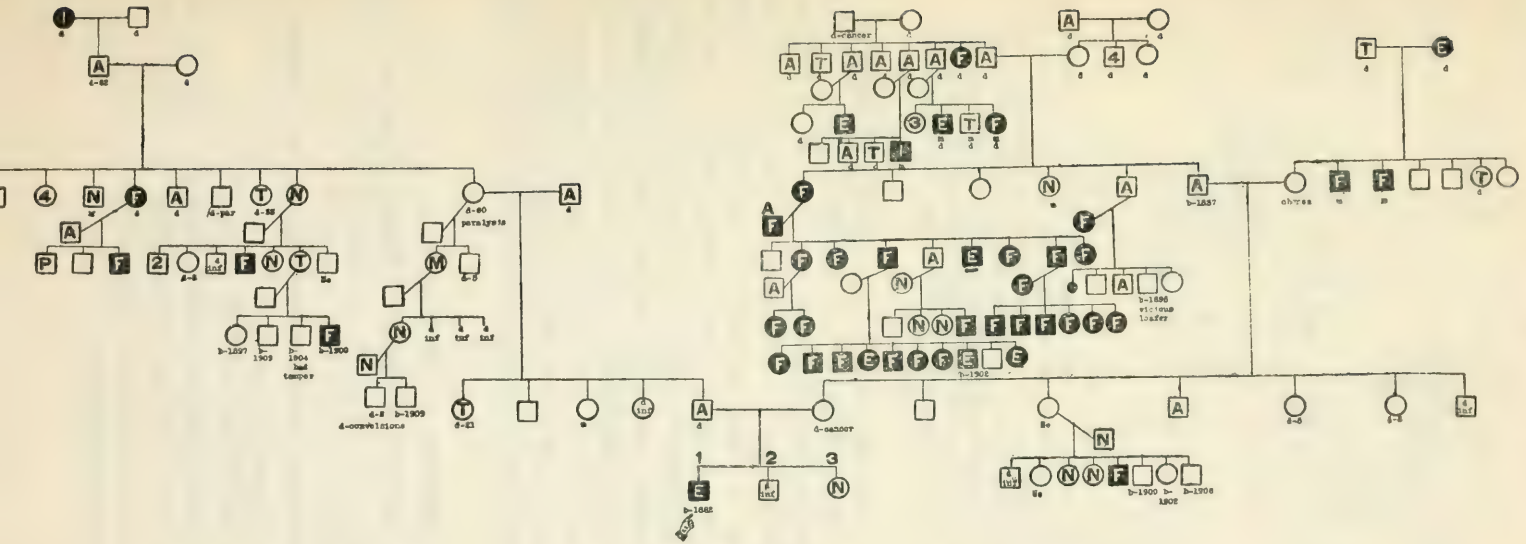
Case 2029.

Fig. 15.—The central mating in this pedigree is of an alcoholic man with a migrainous woman. The man had an alcoholic father, two epileptic uncles, an insane aunt, while one of his uncles had an epileptic daughter. The woman had one aunt who had a feeble-minded son. The children from this mating are what would be expected, one normal, one epileptic, and two tainted. E, epileptic; I, insane; F, feeble-minded; T, tubercular; A, alcoholic; C, criminalistic; M, migrainous; N, normal; b, born; d, died.



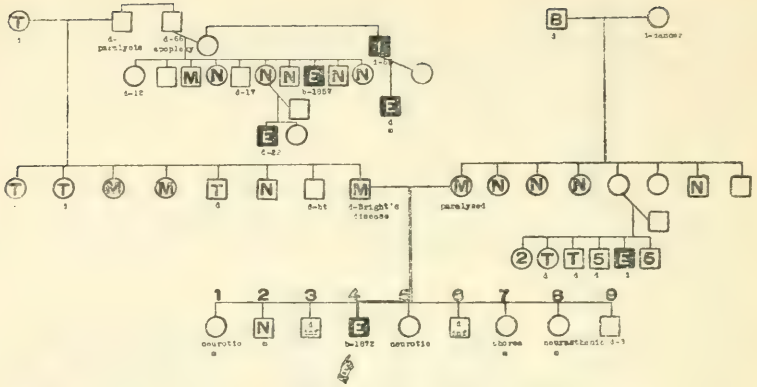
Case 2016.

Fig. 17.—The father of the principal fraternity comes from the same strain as the epileptic mother of the principal fraternity in Case 4369. He married into an alcoholic and neurotic strain. There were four children by this union, the first epileptic, two neurotic, and one apparently normal. E, epileptic; F, feeble-minded; I, insane; A, alcoholic; N, normal; d, died; b, born; inf, infancy.



Case 1745.

Fig. 16.—This family has furnished a large number of the defectives in the county from which it comes. The many feeble-minded persons have married and had feeble-minded or epileptic offspring. They are probably related, by marriage at least, to Case 1334. The central mating is that of a woman of uncertain mentality, who died of cancer, (her mother suffered from chorea, her father is a worthless drunkard), married to a man who for many years was a hard drinker and then became an ardent member of the church. They had three children, the first an epileptic, the second died in infancy, the third is apparently normal. E, epileptic; F, feeble-minded; A, alcoholic; Ne, neurotic; I, insane; Sx, sexually immoral; N, normal; b, born; d, died; inf, infancy.



Case 4286.

Fig. 18.—The family shown on this chart is related to history XXXVIII. The members of these two families are leading citizens in the community in which they reside. In the central mating the father and mother are both migrainous they had nine children; three died very early, one epileptic and the remainder neurotic, choreic and neurasthenic. The mother is now paralysed, has lost the power of speech, and is unable to walk. E, epileptic; F, feeble-minded; A, alcoholic; M, migrainous; N, normal; d, died; b, born; inf, infancy.

In these matings there was an excess of epileptic and feeble-minded beyond the expectations, which would seem to indicate that some of these tainted conditions are more closely allied with the cause of epilepsy and feeble-mindedness than has so far been recognised. The fact that there were more than five times as many epileptics as feeble-minded persons tends to show that these neurotic and otherwise tainted conditions are more closely allied with epilepsy than with feeble-mindedness. It is a significant fact that out of the 84 matings, in four of them both parents were migrainous, while in 23 one parent was migrainous, and 14 of these were mated to alcoholics. Of the remaining 57 matings, in seven both parents were alcoholic, and in 30 matings one parent was alcoholic, making a total of 44 (14 + 30) where one parent was alcoholic. (See pages 93, 94, Tables VIII.-IX.)

SIMPLEX × NORMAL.

Under this classification we have attempted to analyze those fraternities in which one parent was tainted, although not epileptic or feeble-minded, and the other one normal.

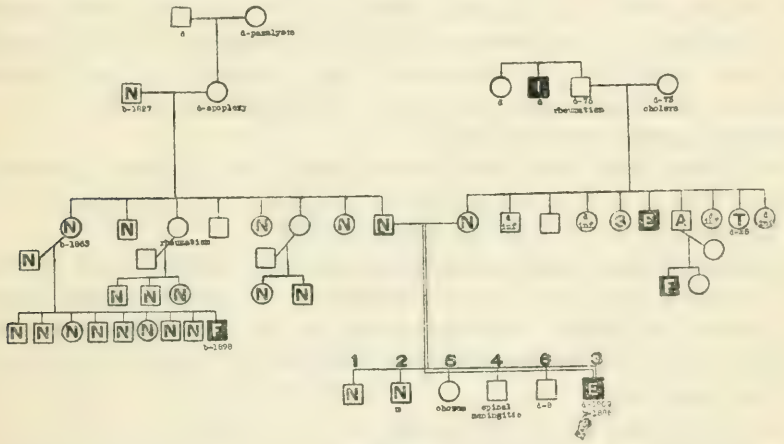
In 127 fraternities there were 790 conceptions. Of the 477 classified as normal, mentally deficient or tainted; 130, or 27%, are epileptic; and 15, or 3%, feeble-minded. (See pages 88, 89, 90, Table VI.) (Fig. 13.)

At least 74 of these reported normal parents (see page 98, Table B), have been found by the field worker to have tainted heredity, so that these matings are of the type simplex × simplex, and the findings would seem to indicate that the matings are all of this type.

Normal × Normal.

Under this type of mating we have grouped all those fraternities in which both parents are recorded as normal.

In the study of 76 fraternities there were 441 conceptions; 62 are too young for classification or entirely unknown, 103 died before the age of 14 years. Of the 276 others, 172 are normal, 75 or 27% are epileptic and three or 1% feeble-minded, with one insane and 25 tainted, that is, 197 (172 + 25), or 71% are duplex or simplex in character. (See pages 91, 92, Table VII.) (Fig. 19.)



Case 874.

Fig 19.—Here we have two seemingly normal parents with defective offspring. The father's relatives, as far as known, are normal, with the exception of a feeble-minded nephew. The mother has an insane uncle, an epileptic brother, and a feeble-minded nephew. Of their six children, two are normal, one who now appears normal had chorea, one had spinal meningitis, is now slightly deaf and inclined to be nervous, one died at the age of eight, the third child was an epileptic. The father of this fraternity is the political leader of the town in which he lives, and is one of its most prosperous citizens. E, epileptic; F, feeble-minded; A, alcoholic; I, insane; d, died; b, born; inf, infancy.

The results show that these normal parents are not duplex, but simplex, and a study of their ancestors justifies this conclusion, for in at least 45 of the matings, one or both parents descended from tainted ancestors. (See page 99, Table C).

For a graphic illustration of the fitting of the findings to the expectations in the six types of matings see curves in Table XI. (page 96).

Migraine and Alcohol.

The large number of alcoholic and migrainous parents justifies a special study of these matings.

In 50 matings where at least one parent is migrainous, there were 350 conceptions, of which number enough is known of 212 to classify 55 or 26%

as epileptic, 12 or 6% as feeble-minded, with the others tainted or normal. (See page 93, Table VIII.)

In the 131 matings where at least one parent is alcoholic, there were 845 conceptions. Of the 494 classified, 151, or 31%, were epileptic, 54, or 11%, feeble-minded, with the balance tainted or normal. (See page 94, Table IX.)

CONCLUSIONS.

All the available facts point towards the conclusion that the various common types of epileptics seen in institutions lack some element necessary for complete mental development, which is also true of the feeble-minded.

Two epileptic parents produce only defective offspring, when both parents are either epileptic or feeble-minded their offspring are also mentally defective, the defect taking the form of epilepsy, feeble-mindedness, or some other neuropathic condition.

Our present data shows that epilepsy tends in the successive generations to form a larger part of the population, probably due to the greater density of the existing defect inside the strains studied.

In the light of our present knowledge the results obtained from the study of our data do not justify the classification of the reported normal parents of epileptics as duplex. We are forced to the belief that their germ plasm is simplex, and feel confident that more complete data would show the taint in their ancestors.

Our data seems to support the belief that alcohol is a cause of defect, in that more children of alcoholic parents are defective than where alcoholism is not a factor.

That there are more than five times as many epileptics as feeble-minded persons in those fraternities coming from matings where neither parent can be classed as normal, or called mentally defective, seems to indicate that neurotic and otherwise tainted conditions are more closely related to epilepsy than to feeble-mindedness.

It will be seen from the present evidence that epilepsy cannot be considered as a Mendelian factor, when considered by itself, but that epilepsy and feeble-mindedness are Mendelian factors of the recessive type, in that their germ cells lack the determiner for normality, or are nulliplex in character, while the tainted individuals, such as neurotics, criminals, sex-offenders, etc., are simplex, and the normals duplex or simplex in character.

I am indebted to our field worker, Mrs. D. Lucile Field Woodward, for the preparation of the tables and charts, and for valuable suggestions and assistance in the preparation of this paper.

Form for the Written Heredity History.

Name, *Consecutive Number,*

Date.

Source of information.

a—name; b—relation to patient; c—address.

The patient and his home.

A.—Description of the patient.

B.—Housing conditions: tenement, house, number of rooms, general condition.

C.—Home treatment: good, bad, fair, neglectful.

D.—Number in the household: adults, children; number defective, number normal.

E.—Financial condition: good, moderate, poor, very poor.

F.—Neighbourhood: good, fair, bad.

G.—Education: time in school, grade attained, reason for leaving.

A description of the individuals on the chart covering the following points —name, sex, date and place of birth, mental and physical condition, if married a description of consort and children, if immigrant the date of immigration, if dead cause and place of death—is written up under the following headings:—

1.—*The patient's fraternity* (the patient's brothers and sisters).

2.—*The patient's father and his fraternity.*

3.—*The patient's father's father and his fraternity.*

4.—*The patient's father's mother and her fraternity.*

5.—*The patient's mother and her fraternity.*

6.—*The patient's mother's father and his fraternity.*

7.—*The patient's mother's mother and her fraternity.*

HEREDITY CARD.

Age Chr. B-S. No.

F. FF. FM. M. MF. MM. Birth-Rank.

	E	F	I	G	S	A	T	B	D	P	M	Ne	C	Sx	W	N	d inf	d yg	Un	Mis	Sb					Total.
Patient and Sibs																										
Father and Sibs																										
Father's Relatives																										
Mother and Sibs																										
Mother's Relatives																										
TOTAL																										
NOTES.																										

BS, Binet Simon; F, father; FF, father's father; FM, father's mother; M, mother; MF, mother's father; MM, mother's mother; Sibs, brothers and sisters; E, epileptic; F, feeble-minded; I, insane; G, gonorrhœa; S, syphilis; A, alcoholic; T, tubercular; B, blind; D, deaf; P, paralysis; M, migraine; Ne, neurotic; C, criminalistic; Sx, sexually immoral; W, wanderer; N, normal; d inf, died in infancy, before 2 yrs.; d yg, died young, before 14 years; Un, unclassified; mis, miscarriage; sb, stillbirth.

REGISTRATION CARD.

COUNTY.

NAME.	b—	V.	ap.	In.	Out.	Remarks.

b, date of birth; V, a patient at the New Jersey State Village; ap, an applicant for admission to the New Jersey State Village; In, receiving care in some other institution; Out, at large receiving no care.

TABLE I.

THE FREQUENCY OF THE DIFFERENT CLASSES OF MENTAL CONDITION IN THE CHILDREN OF TWO MENTALLY DEFECTIVE PARENTS; TOGETHER WITH THE MENTAL CONDITION OF THE GRANDPARENTS, THE PARENTS' SIBS (BROTHERS AND SISTERS) AND OTHER BLOOD RELATIVES ABOUT WHOM SOMETHING IS KNOWN.

Abbreviations.—A, alcoholic; ap, apoplexy; B, blind; bd, affected with Bright's desease; C, criminalistic; ca, cancerous; cb, childbirth; ch, choreic; cr, cripple; D, deaf; dau, daughter; dfm, deformed; dp, dementia præcox; dt, delirium tremens; dw, dwarf; dy, dropsical; E, epileptic; ec, eccentric; en, encephalitis; F, feebleminded; f, father; ff, father's father; fm, father's mother; go, gôitre; gp, general paralysis of the insane; ht, heart disease; hy, hysteric; I, insane; id, ill defined organic desease; kd, kidney desease; la, locomotor ataxia; M, migrainous; m, mother; md, manic depressive insanity; mf, mother's father; mm, mother's mother; N, normal; Ne, neurotic; np, neuropathic; obs, obesity; P, paralytic; pa, paranoiac; pn, pneumonia; S, syphilitic; sb, softening of the brain; sc, scoliosis; sd, senile dementia; sh, shiftless; sm, simple meningitis; st, stillborn; su, suicide; Sx, unchaste; T, tuberculosis; tf, typhoid fever; tu, tumour; va, varicose veins; ve, vertigo; W, vagrant; ?, implies doubt; un, unclassified; d, died.

	Serial Number.	Children. Total	d*	be're	l4	un	N	E	F	I	M	Ne	A	P	Sx	f	ff	fm	f's sibs. Total	d*	be're	l4	un	N	Ne	np	m's other relatives. Total	d*	be're	l4	un	N	Ne	np	m	mf	mm	m's sibs. Total	d*	be're	l4	un	N	Ne	np	m's other relatives Total	d*	be're	l4	un	N	Ne	np
1	3667	4	...	...	...	3	1	...	...	...	...	...	...	...		E	dy	dy	6	...	...	6	...	...		23	...	21	1	1	...		E	...	...	3	...	...	1	2	...	7	...	6	...	1^{1}	...						
2	4539	16	4	...	...	3	1	...	2	6	...	...	...			E	ecc	...	5	2	2	...	1	...		15	...	15	...	...	...		E	...	...	8	6	...	2	...	...	23	6	17	...	...	...						
3	IXa	8	4	1	...	2	1	...	...	...	...	...	...	...		E	E	...	2	...	...	...	...	2^{12}		...	...	...	...	...	...		E	sh	E	12	9	...	...	...	3^{6}	23	7	15	...	...	1^{12}						
4	3162	4	1^{2}	...	...	1	2^{3}	...	...	...	...	...	...	...		A F C	A C	...	5	...	2	...	...	3^{4}		11	...	8	...	3^{5}	...		E	A C F	F Sx	5	...	2	...	...	3^{6}	...	...	...	...	...	...						
5	586	1	...	...	...	1	...	...	...	...	...	...	...	...		F	...	...	...	...	...	...	...	...		...	...	...	...	...	...		F Sx	...	d-T	10	5	4	1	...	...	10	6	2	2	...	...						
6	2842	7	3	...	...	3	1	...	...	...	...	...	...	...		F	F C	N?	5	...	1	...	3^{11}	1^{12}		4	2	2	...	...	...		F Sx	A	N ?	5	1	1	...	2^{13}	1	12	6	2	...	4^{14}	...						
7	2857	3	1	...	...	1	1	...	...	...	...	...	...	...		F	F C	N?	5	...	1	...	3^{11}	1^{12}		4	2	2	...	...	...		F Sx	A	N ?	5	1	1	...	2^{13}	1	12	6	2	...	4^{14}	...						
8	3054	6	1	...	...	2	3	...	...	...	...	...	...	...		F	F	F	6	...	1	...	...	5^{7}		57	...	50	...	1^{15}	67		E	d-T	Ne	4	1	...	1	2	...	58	...	49	3	3^{1}	3^{19}						
9	4369 / 2016	6	1	...	...	1	4	...	...	...	...	...	...	...		F P	A	...	4	...	3	...	...	1^{12}		24	1	19	...	3	1^{7}		F	...	I	4	1	1	...	2	...	19	1	18	...	...	...						
10	XII	8	1	2	...	1	4	...	...	...	...	...	...	...		E	A	M	5	1	2	...	2	...		17	...	15	...	2	...		F A Sx	A	A M	10	5	1	...	2	2	16	...	16	...	...	...						
11	5412	6	1	1	...	4	...	...	...	...	...	...	...	...		A F	A	...	7	...	5	2	...	...		34	5	29	...	...	...		E	A	F	...	...	...	...	...	...	13	...	10	...	3	...						
12	597	8	1	...	...	7	...	...	...	...	...	...	...	...		F	A	dy	8	2	3	...	2	1^{12}		90	4	80	2	4	...		E	F	E	6	2	...	...	...	4	115	11	84	1	3	16						
13	597a	7	2	...	...	3	2	...	...	...	...	...	...	...		F A	...	...	2	...	2	...	...	...		...	...	...	...	...	...		E	...	d-dy	12	3	8	1	...	...	...	...	...	...	...	...						
14	1983a	4	2	1	...	...	...	1	...	...	...	...	...	...		E	A Ne	...	1	...	1	...	...	...		...	...	...	...	...	...		F Sx	...	...	...	...	...	...	...	...	...	...	...	...	...	...						
15	1334c	2	...	1	...	...	1	...	...	...	...	...	...	...		E	ecc	...	...	...	...	...	...	...		...	...	...	...	...	...		F	A	...	...	...	...	...	...	...	...	...	...	...	...	...						
16	2234a	3	...	...	...	2	1	...	...	...	...	...	...	...		E	...	d-P	3	1	2	...	...	...		...	...	...	...	...	...		F	...	...	...	...	...	...	...	...	...	...	...	...	...	...						
17	XXXa	4	2	...	...	...	2	...	...	...	...	...	...	...		F	...	...	...	...	...	...	...	...		...	...	...	...	...	...		E	A	F	...	...	...	...	...	...	...	...	...	...	...	...						
18	1286	8	...	5	...	1	2	...	...	...	...	...	...	...		F A	...	...	...	...	...	...	...	...		...	...	...	...	...	...		E	A	F	...	...	...	...	...	...	...	...	...	...	...	...						
19	2105	1	...	...	...	1^{26}	...	...	...	...	...	...	...	...		F	...	dy	...	...	...	...	...	...		...	...	...	...	...	...		F	...	...	...	...	...	...	...	...	...	...	...	...	...	...						
20	3037	7	...	1^{25}	...	1	5	...	...	...	...	...	...	...		F A	N	N	6	2	...	2	1	1		...	...	...	...	...	...		F	A	...	2	...	...	1	1	...	1	...	1	...	...	...						
21	4172	3	...	...	...	1	2	...	...	...	...	...	...	...		F	d-T	...	2	...	1	...	1^{1}	...		4	...	3	...	...	1^{7}		F Sx	...	F Sx	...	...	...	...	...	...	1	1	...	...	...	...						
22	3387	13	4	1	...	2	5	...	...	1	...	...	...	...		F	...	d-P	3	...	2	...	...	1		16	1	15	...	...	...		F	A	dy	8	5	1	2	...	...	90	8	65	5	8^{8}	4^{9}						
23	IX	12	3	2	..	2	5	...	...	...	...	...	...	...		F A T	Ht	F	8	6	1	...	...	1^{12}		20	3	12	...	...	5		E	...	E	12	9	...	...	...	3	58	12	42	...	...	4						
24	1334b	6	...	4	...	...	2	...	...	...	...	...	...	...		F	...	...	...	...	...	...	...	...		...	...	...	...	...	...		F	...	ca	4	...	2	...	2	...	...	...	...	...	...	...						
25	1745a	11	...	3	...	1	6^{21}	...	...	1	...	...	...	...		F	...	...	...	...	...	...	...	...		...	...	...	...	...	...		F	A	...	4	1	...	1	1	1^{7}	20	...	13	...	6^{1}	1^{7}						
26	1745b	6	...	...	...	...	6	...	...	...	...	...	...	...		F	F	ch	10	...	3	...	1^{1}	6^{22}		...	...	...	...	...	...		F	...	...	...	...	...	...	...	...	...	...	...	...	...	...						
27	5386a	1	...	...	...	...	1	...	...	...	...	...	...	...		F	F	...	4	...	...	1	2^{1}	1^{7}		...	...	...	...	...	...		F Sx	...	d-P	4	...	3	...	...	1^{20}	...	...	...	...	...	...						

Ia.

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TABLE II.

The Frequency of the Different Classes of Mental Condition in the Children of Parents One of Whom is Mentally Defective and the other Alcoholic; together with the Mental condition of the Grandparents, the Parents' Sibs and other Blood Relations about Whom Something is Known.

Abbreviations.—A, alcoholic; ap, apoplexy; B, blind; bd, affected with Bright's disease; C, criminalistic; ca, cancerous; cb, childbirth; ch, choreic; cr, cripple; D, deaf; dau, daughter; dfm, deformed; dp, dementia præcox; dt, delirium tremens; dw, dwarf; dy, dropsical; E, epileptic; ec, eccentric; en, encephalitis; F, feeble-minded; f, father; ff, father's father; fm, father's mother; go, göitre; gp, general paralysis of the insane; ht, heart disease; hy, hysteric; I, insane; id, ill defined organic disease; kd, kidney disease; la, locomotor ataxia; M, migrainous; m, mother; md, manic depressive insanity; mf, mother's father; mm, mother's mother; N, normal; Ne, neurotic; np, neuropathic; obs, obesity; P, paralytic; pa, paranoiac; pn, pneumonia; S, syphilitic; sb, softening of the brain; sco, scoliosis; sd, senile dementia; sh, shiftless; sm, simple meningitis; st, stillborn; su, suicide; Sx, unchaste; T, tuberculosis; tf, typhoid fever; tu, tumor; va, varicose veins; ve, vertigo; W, vagrant; ? implies doubt; d, died; un, unclassified.

	Serial No.	Children. Total	d* before 14	un	N	E	F	I	M	Ne	A	P	Sx	f	ff	fm	f's sibs. Total	d* bef'e 14	un	N	Ne	np	f's other relatives. Total	d* bef'e 14	un	N	Ne	np	m	mf	mm	m's sibs. Total	d* bef'e 14	un	N	Ne	np	m's other relatives. Total	d bef'e 14	un	N	Ne	np
1	1649	1	...	...	...	1	...	...	...	...	...	...	...	A	...	...	...	...	...	...	...	...	...	...	...	...	...	...	E	E	d bd	7	1	...	4	1	1^8	39	3	30^{17}	2	...	4^{18}
2	1662	5	4	...	...	1	...	...	...	...	...	...	...	A	...	A P	11	...	11	...	...	...	3	...	...	3	...	...	E	...	I	7	6	1	...	...	...	1	...	...	...	...	1^{18}
3	1772	17	14^{16}	...	...	1	...	...	...	2	...	...	...	A Sx	...	I	3	...	...	3	...	...	11	1	1	8	1	...	E	N	E	...	...	...	...	...	...	22	9	13^{15}	...	...	...
4	1976	8	2	...	2	1	1	...	...	2^{19}	...	...	...	A D	...	...	...	...	...	...	...	...	7	...	2	3	1	1^5	E^{20}	I^{21}	ca	6	1	3	2	...	...	34	2	26	1	3	2^8
5	2487b	2	...	...	...	2	...	...	...	...	...	...	...	A	...	...	...	...	...	...	...	...	...	...	...	...	...	...	E	P	M	11	2	...	3	5	1^{22}	29	...	16	5	3	5^{28}
6	2601	3	...	...	...	1	2	...	...	...	...	...	...	A	...	...	...	...	...	...	...	...	...	...	...	...	...	...	E	I^{15}	d-P	8	...	6	2^1	...	...	21	...	20	...	...	1^8
7	2769	12	2	3	3	2	1	...	...	...	1	...	...	A^{15}	...	...	6	...	3	2	1	...	13	...	10	...	2^{24}	1^5	E	...	...	6	...	6	...	...	...	19	...	19	...	...	...
8	3104	3	1	1	...	1	...	...	...	...	...	...	...	A	...	...	...	...	...	...	...	...	...	...	...	...	...	...	E	...	...	...	...	...	...	...	...	...	...	...	...	...
9	3805	7	5	...	...	1	1	...	...	...	...	...	...	A	d-ap	...	4	1	2	...	1^1	...	...	...	...	...	...	...	E-I	...	...	...	...	...	...	...	...	...	...	...	...	...
10	4062	4	2	...	1	1	...	...	...	...	...	...	...	A	...	ht	4	...	...	4	...	...	4	...	3	...	...	1^8	E	I	Ht	8	2	...	1	3^{26}	2^{25}	34	8	14	7	1	4^{28}
11	4676	5	2	...	...	1	...	...	...	2	...	...	...	A^{29}	I	...	4	2	...	1	1	...	6	...	6	...	...	...	E	bd	ca	10	...	10	...	...	...	...	...	...	...	...	...
12	3224	9	1	2	2	1	...	...	1	2	...	...	...	A	...	...	4	3	...	...	1	...	5	...	5	...	...	...	E	A	...	4	1	2	...	1	...	3	...	3	...	...	...
13	2734	3	...	...	1	1	...	...	...	1	...	...	...	A	I	...	2	...	2	...	...	...	...	...	...	...	...	...	E	...	...	3	...	2	1	...	...	19	4	12	3	...	...
14	2086	4	1	1^{30}	...	1	1	...	...	...	...	...	...	A S	...	...	4	...	2	...	2^1	...	1	...	1	...	...	...	E	A S	A	...	7	2	1	...	2^{31}	2	4	...	3	...	1^1	...
15	3692	4	1	1^{32}	...	1	1	...	...	...	...	...	...	A Sx	...	...	...	...	...	...	...	...	...	...	...	...	...	...	E	...	...	10	5	1^{42}	3	...	1^8	...	...	...	...	...
16	1574b	11	1	2	4^{43}	1	...	...	2	...	1	...	...	A	...	...	6	...	5	...	...	1^5	...	...	...	...	...	...	E	...	...	...	...	...	...	...	...	...	...	...	...	...
17	597d	10	6	...	...	1	2	...	...	...	...	...	1	A	...	...	...	...	...	...	...	...	...	...	...	...	...	...	E	F	E	6	2	...	...	...	4^{41}	...	...	...	...	...
18	624	11	4	...	3	2	2	...	...	...	...	...	...	A	?	?	...	...	...	...	...	...	...	...	...	...	...	...	E	F	?	5	...	2	1^{21}	...	5	...	5	...	...	...
19	1274	4	...	...	...	1	1	...	...	1^2	...	...	1	A	...	...	4	...	2	1	1	...	6	...	6	...	...	...	F	A	ca	3	...	...	2	1	...	9	1	8	...	...	...
20	1319	2	...	...	...	1	1	...	...	...	...	...	...	A	...	I	6	...	...	5^{13}	...	...	18	2	13	...	2^4	1^5	F	...	F	...	...	...	...	...	...	22	1	20	...	1	...
21	2561	9	3	...	...	1	5	...	...	...	...	...	...	A	A	...	5	...	2	...	3^6	...	30	1	20	4	4^7	1^8	F	A	...	4	...	4	...	...	...	67	14	30^9	4	12^{10}	7^{11}
22	3189a	8	5	...	1	2	...	...	...	...	...	...	...	A	...	...	...	...	...	...	...	...	...	...	...	...	...	...	F A	...	...	3	...	1	...	2^4	...	15	...	14	...	...	1^8
23	3429	11	5	...	...	1	2	...	...	3	...	...	...	A	...	dy	5	1	...	2	2^{12}	...	26	...	24	...	1	1^5	F	...	dy	8	1	4	...	3^{18}	...	15	2	13	...	...	...
24	3384	13	6	...	1^2	2	3	...	...	1^{14}	...	...	...	A	...	d-P	3	...	3	...	...	...	16	...	15	...	...	1^5	F	A	dy	8	5	1	2	...	...	36	2	32^{15}	...	2^{16}	...
25	4403b	3	...	...	...	...	3	...	...	...	...	...	...	A	...	...	...	...	...	...	...	...	...	...	...	...	...	...	F	...	...	...	...	...	...	...	...	...	...	...	...	...
26	2645	7	1	...	...	2	4	...	...	...	...	...	...	A	T	...	8	2	3	2^1	1^1	...	42	...	37	2	3^1	...	F	...	...	2	...	...	...	25	...	...	...	...	...	...
27	XXX	7	2	2	...	2	...	...	...	1	...	...	...	A	Sx	...	...	...	...	...	...	...	11	...	10	...	...	1^{22}	F	A	E ?	13	7	4	...	1^{32}	1^8	Si	...	6	6^{23}	1	12^{24}
28	XXVII	2	1	...	...	1	...	...	...	...	...	...	...	A	N	...	6	...	4	2	...	...	14	1	10	3	...	...	F Sx	ecc	Sx	2	...	2	...	...	...	1	...	...	...	...	1^5
29	VI	3	2	...	...	1	...	...	...	...	...	...	...	A	A	...	1	...	1	...	...	...	5	2	3	...	...	...	Ne F	...	...	3	2	1	...	...	...	16	...	15	...	1^{35}	...
30	5194	1	...	...	...	1	...	...	...	...	...	...	...	A	...	...	...	...	...	...	...	...	...	...	...	...	...	...	F	...	...	6	...	5	...	1^1	...	5	...	3	...	2^1	...
31	4863	6	2	1	...	1	1	...	...	...	1^{36}	...	...	F A	...	...	1	...	1	...	...	...	...	...	...	...	...	...	A	...	...	4	...	3	...	1^1	...	3	...	1	...	2^{35}	...
32	3912	9	1	...	2	1	3	1	...	...	...	...	1	A	N	N	7	...	...	2	4	1^5	17	3	11	...	2	1^5	F	...	...	3	...	1	...	1^{22}	9	...	7	...	...	2^{22}
33	3752	7	4	1	...	2	...	...	...	...	...	...	...	A	...	...	...	...	...	...	...	...	...	...	...	...	...	...	F	...	...	2	1	...	1	...	...	...	...	...	...	...	...
34	597c	13	...	8	...	...	2	...	...	1^{40}	2	...	...	A	...	...	...	...	...	...	...	...	...	...	...	...	...	...	F	F	E	6	2	...	...	...	4^{41}	...	...	...	...	...
35	1745d	2	...	...	...	...	2	...	...	...	...	...	...	A	...	...	...	...	...	...	...	...	...	...	...	...	...	...	F	F	F	10	...	3	...	1^1	6^{44}	...	...	...	...	...	...

TABLE III.

THE FREQUENCY OF THE DIFFERENT CLASSES OF MENTAL CONDITION IN THE CHILDREN OF PARENTS ONE OF WHOM IS MENTALLY DEFECTIVE AND THE OTHER HAS APPARENT *Neurosis;* TOGETHER WITH THE MENTAL CONDITION OF THE GRANDPARENTS, THE PARENTS' SIBS, AND OTHER BLOOD RELATIVES ABOUT WHOM SOMETHING IS KNOWN.

Abbreviations.—A, alcholic; ap, apoplexy; B, blind; bd, affected with Bright's disease; C, criminalistic; ca, cancerous; cb, childbirth; ch, choreic; cr, cripple; D, deaf; dau, daughter; dfm, deformed; dp, dementia præcox; dt, delirium tremens; dw, dwarf; dy, dropsical; E, epileptic; ec, eccentric; en, encephalitis; F, feebleminded; f, father; ff, father's father; fm, father's mother; go, gôitre; gp, general paralysis of the insane; ht, heart disease; hy, hysteric; I, insane; id, ill defined organic disease; kd, kidney disease; la, locomotor ataxia; M, migrainous; m, mother; md, manic depressive insanity; mf, mother's father; mm, mother's mother; N, normal; Ne, neurotic; np, neuropathic; obs, obesity; P, paralytic; pa, paranoiac; pn, pneumonia; S, syphilitic; sb, softening of the brain; sco, scoliosis; sd, senile dementia; sh, shiftless; sm, simple meningitis; st, stillborn; su, suicide; Sx, unchaste; T, tuberculosis; tf, typhoid fever; tu, tumor; va, varicose veins; ve, vertigo; W, vagrant; ? implies doubt; d, died; un, unclassified.

	Serial No.	Children. Total	d* bef'e14	un	N	E	F	I	M	Ne	A	P	Sx	f	ff	fm	f's sibs. Total	d* bef'e14	un	N	Ne	np	f's other relatives. Total	d* bef'e14	un	N	Ne	np	m	mf	mm	m's sibs. Total	d* bef'e14	un	N	Ne	np	m's other relatives. Total	d befr'e14	un	N	Ne	np
1	3906	6	2	1	...	2	...	...	...	1	...	...	...	E	...	...	0	...	0	...	...	...	2	...	...	...	...	2^4	M	...	...	6	...	6	...	...	...	2	...	2^5	...	...	...
2	4078	4	...	...	2	1	...	...	1	...	...	...	...	E^6	A	A	2	...	2^7	...	...	...	31	3	20	2	6^8	...	ch	d-p	d-ca	8	...	3^7	2	2	1^9	34	...	14	$6\,9^1$	5^{11}
3	835	8	4	1^7	1	2	...	...	...	...	...	...	...	E	d-ca	T	5	1	3^{12}	...	...	1^9	13	1	12	...	...	...	d-P	A	...	14	13	1	...	...	...	5	...	4^{13}	...	1	...
4	1174	19	12	3	2	1	...	...	...	1	...	...	...	d-P	...	...	4	...	4	...	...	...	...	...	...	...	...	...	E	...	d-ap	3	...	...	1^{14}	1^9	1^4	16	...	6	4	$1\,3^{15}$
5	{4369 / 2016} b	6	3	...	2	1	...	...	...	...	...	...	...	P	A	N	4	...	...	...	3	1^9	22	1	19	...	1	1^9	E	?	I	4	2	...	...	2	...	43	2	28	3	1	9
6	473	5	1	...	2	1	...	...	...	1	...	...	...	E	A	...	7	2	...	2	3^1	...	12	...	1	10	1^{16}	...	Ne	N	N	1	...	1	...	...	...	2	...	...	2	...	...
7	3402	3	...	1	...	1	...	...	...	1^{17}	...	...	...	E	N	d-ca	7	1	1	3	...	2^4	34	2	29	...	3^{18}	...	Ne	...	...	3	...	...	2	1^{19}	...	19	7	10	2	...	...
8	{504 / 3781} a	6	...	...	2	1	...	...	...	3	...	...	...	Ne	N	I	6	...	2	2	2	...	46	...	2	34	5	5	E	N	...	2	2	...	...	...	...	...	...	...	...	...
9	3326	8	4	1	1	1	...	...	...	...	...	...	1	M	T	...	6	...	4^{20}	...	1^{21}	1^2	28	10	18^{20}	...	...	...	E	su	...	12	1	9	2	...	...	6	2	...	4	...	...
10	2784	8	...	5	...	1	1	...	...	1	...	...	...	S^{22}	A	13	7	...	6	...	...	1^9	13	2	10	...	...	1^4	E	A	A	5	2	1	...	1^{23}	1^4	54	1	44^{24}	...	4	5^{25}
11	1869	4	2	...	...	1	1	...	...	...	...	...	...	E	T	Ne	4	4	...	...	...	...	3	...	3	...	...	...	P	...	I	5	2	3	...	...	...	...	...	...	...	...	...
12	825	1	...	...	...	1	...	...	...	...	...	...	...	C	...	...	...	...	...	...	...	...	...	...	...	...	...	...	E	...	F	6	...	6	...	...	...	...	...	...	...	...
13	3692	2	1	...	...	1	...	...	...	...	...	...	...	E	A	E	3	1	1	...	...	1^9	44	8	23	12	...	1^9	Ne	...	ca	5	...	3	...	1	1^2	43	8	28	6	...	1^9
14	5537	7	2	2	...	1	...	...	...	2	...	...	...	E	A	S	Sx	M	7	1	1	...	5^{21}	...	7	...	5	...	1	1	S	...	T	4	2	...	1	1	...	12	12	...	...	...	...
15	4652	3	2	...	...	1	...	...	...	...	...	...	...	E	T	...	6	...	4	1	1	...	21	1	15	5	...	...	Ne	F	N	8	2	3	...	3	...	8	2	6	...	...	...
16	4326	10	2	1	...	2	3	...	...	1	...	...	1	E	A	Sx	...	...	...	...	...	...	...	...	...	...	...	...	Ne	A	I	7	4	1	...	...	2	19	2	9	3	2	3
17	257	4	2	...	...	1	...	...	1	...	...	...	...	E	...	...	7	1	6	...	...	...	26	2	24	...	...	...	d-ap	...	...	5	...	5	...	...	...	10	...	10	...	...	...
18	4103	8	2	2	...	1	...	...	1	2	...	...	...	F	A	...	6	...	3	...	2^1	1^2	15	...	10	...	5^3	...	M	...	E	4	1	3	...	...	...	7	...	7	...	...	...
19	2309	11	6	1	1	1	1	...	...	1^{26}	...	...	...	C	...	...	2	...	2	...	...	...	...	...	...	...	...	...	F	A	A	13	6	5	...	2^{23}	...	44	...	39	...	3^1	1^{27}
20	5016	3	...	...	...	2	...	...	1	...	...	...	...	A	F	T	...	...	...	...	...	...	...	...	...	...	...	...	M	T	ca	12	6	1	...	5	...	27	9	16	...	1	1^4
21	4809	8	4	2	1	...	...	...	1	...	...	...	...	F?	...	...	6	...	6	...	...	...	...	...	...	...	...	...	Ne	...	...	6	...	4	1	1	...	18	5	13	...	...	...
22	4339	6	2	1	...	1	...	...	...	1	...	1	...	F	...	...	7	1	4	...	...	2^9	20	...	...	...	17	3^9	Ne	...	...	2	2	...	...	...	...	5	...	5	...	...	...
23	5137a	2	1	...	...	...	...	...	...	...	...	...	1^{26}	Sx	A	F	...	...	...	...	...	...	...	...	...	...	...	...	A S C Sx	...	M S Sx	8	5	1	...	2^{28}	...	...	...	...	...	...	...
24	597e	4	2	...	...	2	...	...	...	...	...	...	...	F	F	...	7	...	6	...	1^1	...	6	3	...	1	...	2^{29}	Sx C A	...	...	...	...	...	...	...	...	...	...	...	...	...
25	4761	15	11	...	2	1	1	...	...	...	...	...	...	M	...	...	...	...	...	...	...	...	3	...	2	...	...	1^4	F?	...	A Sx	3	...	1	...	1^1	1^9	3	...	3	...	...	...

IIIa.

1	1365	2	...	...	...	1	...	...	...	1	...	...	...	I	...	...	6	2	4	...	...	...	5	...	5	...	...	...	d-P	...	...	...	...	...	...	...	...	...	...	...	...	...	...
2	2070	8	1	...	5	2	...	...	...	...	...	...	...	Ne	...	...	5	...	5	...	...	...	...	...	...	...	...	...	I	...	...	2	2	...	...	...	...	...	...	...	...	...
3	3897	5	3	...	1	1	...	...	...	...	...	...	...	Ne	...	...	5	...	5	...	...	...	...	...	...	...	...	...	I	A	...	3	...	1	...	2^1	...	7	...	7	...	...	...
4	3716	9	1	5	1	1	...	...	...	1	...	...	...	Ne	...	...	6	...	5	...	1^1	...	19	2	17	...	...	...	I	...	...	5	...	5	...	...	...	15	...	15	...	...	...
5	2167	8	3	1	...	3	...	...	1	...	...	...	...	Ne	d-ca	...	2	...	...	1	1	...	8	...	5	2	...	1^4	I	I	N	11	5	6	...	...	...	37	6	27	1	1	2^{27}
6	4146	13	2	3	2	1	...	...	2	3	...	...	...	Su	...	...	1	...	1	...	...	...	...	...	...	...	...	...	I	...	...	5	...	5	...	...	...	17	1	16	...	...	...

NOTES.—[1] A, [2] su, [3] C, [4] E, [5] all d-T, [6] petit mal, [7] d-cancer, [8] 5 A 1 ch, [9] F, [10] 4 A 2 Ne 2 Sx 1 C, [11] 1 E 4 F, [12] 1 d-tumor 1-T, [13] 1 cr and 1 d-ca, [14] sh, [15] 1 E 2 I, [16] hysteria, [17] incorrigible, [18] 2 A 1 Ne, [19] ch, [20] 1 d-T, [21] M, [22] congenital, [23] Sx, [24] 7-T, [25] 1-F 2-I 2-E, [26] C, [27] I, [28] 1-Sx 1 M, [29] 1-E 1-F.

* Includes miscarriages and stillbirths.

TABLE IV.

THE FREQUENCY OF THE DIFFERENT CLASSES OF MENTAL CONDITION IN THE CHILDREN OF PARENTS ONE OF WHOM IS MENTALLY DEFECTIVE AND THE OTHER *Normal*; TOGETHER WITH THE MENTAL CONDITION OF THE GRANDPARENTS, THE PARENTS' SIBS, AND OTHER BLOOD RELATIONS ABOUT WHOM SOMETHING IS KNOWN.

Abbreviations.—A, alcoholic; ap, apoplexy; B, blind; bd, affected with Bright's disease; C, criminalistic; ca, cancerous; cb, childbirth; ch, choreic; cr, cripple; D, deaf; dau, daughter; dfm, deformed; dp, dementia præcox; dt, delirium tremens; dw, dwarf; dy, dropsical; E, epileptic; ec, eccentric; en, encephalitis; F, feeble-minded; f, father; ff, father's father; fm, father's mother; go, gôitre; gp, general paralysis of the insane; ht, heart disease; hy, hysteric; I, insane; id, ill defined organic disease; kd, kidney disease; la, locomotor ataxia; M, migrainous; m, mother; md, manic depressive insanity; mf, mother's father; mm, mother's mother; N, normal; Ne, neurotic; np, neuropathic; obs, obesity; P, paralytic; pa, paranoiac; pn, pneumonia; S, syphilitic; sb, softening of the brain; sco, scoliosis; sd, senile dementia: sh, shiftless; sm, simple meningitis; st, stillborn; su, suicide; Sx, unchaste; T, tuberculosis; tf, typhoid fever; tu, tumor; va, varicose veins; ve, vertigo; W, vagrant; ? implies doubt; un, unclassified; d, died.

	Serial No.	Children. Total	d* before 14	un	N	E	F	I	M	Ne	A	P	Sx	f	ff	fm	f's sibs. Total	d* bef'e 14	un	N	Ne	np	f's other relatives. Total	d* bef'e 14	un	N	Ne	np	m	mf	mm	m's sibs. Total	d* bef'e 14	un	N	Ne	np	m's other relatives, d bef'e 14	un	N	Ne	np
1	666	10	4	2	2	1	...	...	...	...	...	...	1	E	A	...	1	...	...	...	...	1^{6}	...	...	...	...	...	...	N	N	N	7	...	2	5	...	...	54	...	54	...	...	...
2	866	3	1	1	...	1	...	...	...	...	...	...	...	E	...	...	1	...	1	...	...	...	2	...	2	...	...	...	N ?	...	...	...	...	...	...	...	...	...	...	...	...
3	1364e	3	1	...	1	1	...	...	...	...	...	...	...	E	I	d P	1	...	...	...	1	...	11	2	9	...	...	...	N	...	...	...	...	...	...	...	...	...	...	...	...
4	1392	12	8	...	2	1	...	...	...	1	...	...	...	E	A	N	5	2	...	2	...	...	17	2	13	1	1	...	N	...	...	6	2	2	...	1^{8}	1^{3}	51	8	14	25	3	1^{3}
5	2124	8	2	1	3	1	...	...	...	1	...	...	...	E	A	P	10	2	1	...	6	1^{9}	50	11	33	2	4	...	N	...	...	5	...	2	3	...	...	29	5	19	4	1	...
6	2207	7	1	...	...	2	...	...	...	4	...	...	...	N	bd	T	4	...	1	3	...	...	28	1	19	6	1	1^{6}	E	E	...	5	1	1	...	2	1^{9}	47	2	38	...	...	7^{10}
7	2819	7	4	...	1	1	...	...	...	1	...	...	...	E	su	ca	...	...	...	...	...	...	20	...	13	...	1	6	N	T	T	5	...	1	3	...	1^{6}	37	1	16	14	5^{11}	1^{6}
8	3613a	5	1	1	2	1	...	...	...	...	...	...	...	N ?	...	...	...	...	...	...	...	...	...	...	...	...	...	...	E ?	...	...	3	2	...	1	...	...	...	...	...	...	...
9	4326b	3	...	...	3	...	...	...	...	...	...	...	...	N	...	...	...	...	...	...	...	...	...	...	...	...	...	...	E	E Sx	N E	...	...	...	...	...	...	...	...	...	...
10	4357	3	2	...	...	1	...	...	...	...	...	...	...	N	...	...	3	...	...	2	1	...	8	...	8	...	...	...	E ?	...	...	3	...	...	3	...	...	1	...	1	...	...
11	4392	12	2	...	...	4	1	...	...	5	...	...	...	N	d P	...	3	...	3	...	...	...	...	...	...	...	...	...	E	...	...	3	2^{12}	...	...	1	...	...	...	...	...	...
12	4270	1	...	...	...	1	...	...	...	...	...	...	...	E	...	...	9	...	9	...	...	...	...	...	...	...	...	...	N	...	E	15	4	...	11	...	...	14	...	14	...	...	...
13	4896	7	1	2	3	1	...	...	...	...	...	...	...	N	ap	...	4	...	4	...	...	...	3	...	3	...	...	...	E	ap	...	...	...	...	...	...	...	...	...	...	...
14	1054	4	2	...	...	1	...	...	...	1	...	...	...	N	...	T	3	...	3	...	...	...	...	...	...	...	...	...	E	...	ht	...	...	...	...	...	...	...	...	...	...
15	5367	6	5	...	...	1	...	...	...	...	...	...	...	N	A	...	7	2	4	...	1	...	9	...	8	...	1	...	E	...	...	...	...	...	...	...	...	...	...	...	...
16	5114	3	1	...	1	1	...	...	...	...	...	...	...	E	A	N	14	9	4^{20}	...	1	...	24	...	22	...	2^{11}	...	N	...	...	5	...	3	1	1^{11}	...	...	...	...	...	...
17	4382	13	2	3	5	2	1	...	...	...	...	...	...	E ?	...	...	7	...	7	...	...	...	...	...	...	...	...	...	N	...	...	...	...	...	...	...	...	...	...	...	...
18	4137	5	1	...	3	1	...	...	...	...	...	...	...	N	...	...	2	2	...	...	...	...	...	...	...	...	...	...	E	Ne	Ne	4	2	...	...	2^{21}	...	25	8	15	...	...	2^{6}
19	4127	7	2	...	4	1	...	...	...	...	...	...	...	N	A	...	6	...	6	...	...	1^{9}	16	...	15	...	...	1^{6}	E ?	...	...	2	1	...	...	...	...	10	2	8	...	...	...
20	4013	8	1	4	...	1	...	...	...	2	...	...	...	E	d-ca	...	5	...	5	...	...	...	18	1	16	1	...	...	N d-T	...	...	3	...	3	...	...	...	10	...	10	...	...	...
21	3904	6	...	1	2	2	...	...	...	1	...	...	...	E	d-T	Ne	6	...	2^{13}	2	2^{11}	...	65	4	40	14	4^{11}	3^{22}	N	...	ht	8	1	3^{13}	3	1	...	28	...	15	11	2^{11}	...
22	XXXII	8	1	5^{28}	...	2	...	...	...	...	...	...	...	E	...	...	2	...	2	...	...	...	...	...	...	...	...	...	N	...	...	4	3	...	1	...	...	12	...	11	...	...	1^{3}
23	XV	10	5^{29}	...	4	...	1	...	...	...	...	...	...	E	T	kd	...	...	...	...	...	...	...	...	...	...	...	...	N	...	...	...	...	...	...	...	...	...	...	...	...
24	1367a	3	...	1	1	1	...	...	...	...	...	...	...	E	I	d-P	1	...	...	...	1	...	...	...	...	...	...	...	N	...	...	...	...	...	...	...	...	...	...	...	...
25	1703a	2	1	...	...	1	...	...	...	...	...	...	...	N	...	...	...	...	...	...	...	...	...	...	...	...	...	...	E	...	...	4	1	3	...	...	...	44	4	37	...	2	1^{6}

IV.—*continued.*

	Serial No.	Children, Total	d* before 14	un	N	E	F	I	M	Ne	A	P	Sx	f	ff	fm	f's sibs. Total	d* bef'e14	un	N	Ne	np	f's other relatives. Total	d* bef'e14	un	N	Ne	np	m	mf	mm	m's sibs. Total	d* bef'e14	un	N	Ne	np	m's other relatives. Total	d bef'e 14	un	N	Ne	np
26	5521a	4	2	1	...	...	...	...	...	1	...	...	...	E^{30}	T	I	1	...	...	1	...	...	19	2	8	5	4^{11}	...	N	...	...	...	...	...	...	...	...	...	...	...	...	...
27	1714	1	...	...	...	1	...	...	...	...	...	...	...	N	A	D	10	1	3	4	2	...	13	12	...	...	...	1^{9}	E	...	...	...	...	...	...	...	...	...	...	...	...	...
28	4113	2	...	...	2	...	...	...	...	...	...	...	...	E	ca	T	2	...	...	2	...	...	39	3	27	7	2	...	N	...	...	...	...	...	...	...	...	...	...	...	...	...
29	2016 / 4369	3	...	...	1	1	...	...	...	1	...	...	...	E	A	...	4	...	...	...	3^{11}	1^{9}	3	...	2	...	1^{11}	...	N	...	...	...	...	...	...	...	...	...	...	...	...	...
30	2237	4	3^{34}	...	...	1	...	...	...	...	...	...	...	N	...	...	11	1	...	10	...	...	57	9	48	...	...	...	F	T	...	4	1	...	...	...	3^{2}	9	5	3	...	...	1^{3}
31	2685a	3	...	...	2	1	...	...	...	...	...	...	...	N?	...	...	...	...	...	...	...	...	...	...	...	...	...	...	F	? [4]	E	...	...	...	...	...	...	...	...	...	...	...
32	4318	4	2	...	1	1	...	...	...	...	...	...	...	N	...	...	...	6	1	...	5	...	...	8	1	...	7	...	...	F	P	...	3	...	3	...	...	...	10	1	7	2	...	...
33	4521	9	...	1	3	1	2	...	...	1^{7}	...	1	...	N?	?	d P	7	...	4	...	2	1^{8}	38	...	35	1	2^{5}	...	F?	A	?	2	2	...	...	...	...	27	27	...	...	...	...
34	5386	6	...	3	...	1^{19}	...	...	...	2	...	...	...	N	...	E?	9	1	8^{19}	...	...	...	76	4	71	1	...	...	F	F	F Sx	...	...	...	...	...	...	88	10	65^{18}	...	5^{11}	8^{9}
35	5342	8	2	1	...	1	4	...	...	...	...	...	...	N	...	...	3	1	2	...	...	...	2	...	2	...	...	...	F-M	...	...	...	2	...	...	...	...	...	...	...	...	...
36	3426	11	5	1^{13}	...	1	1	...	...	3	...	...	...	T	...	...	5	1	3^{23}	...	1	...	26	2	23	...	1^{21}	...	F	T	d-dy	8	1	6^{25}	...	...	$16^{}$	18	4	14	...	...	...
37	597b	6	...	3	...	...	3	...	...	...	...	...	...	F	E	A	9	6	...	...	1^{31}	2^{15}	60	6	40	1	...	13^{32}	N	...	...	...	...	...	...	...	...	...	...	...	...	...
38	1872c	6	...	5	...	...	1	...	...	...	...	...	...	N	...	...	...	...	...	...	...	...	...	...	...	...	...	...	F	...	bd	5	2	...	2	1	...	49	11	22	12	...	4^{1}

IVa.

1	167b	6	...	4	2	...	...	...	...	...	...	...	...	N T	...	...	...	...	...	...	...	...	...	...	...	...	...	...	I B	...	...	...	...	...	...	...	...	...	...	...	...	...
2	380	4	1	...	1	1	1	...	...	...	...	...	...	I	?	I sd	4	...	3^{13}	1	...	...	44	2	41	...	...	1^{6}	N ?	d P	N	6	...	1	3	1	1^{9}	26	...	19	...	7	...
3	552	6	...	2	2	2	...	...	...	...	...	...	...	T	?	?	2	...	2	...	...	...	...	...	...	...	...	...	P I sd	?	?	...	...	...	...	...	...	...	...	...	...	...
4	898	3	1	...	1	1	...	...	...	...	...	...	...	I bd	kd	...	2	1	...	1	...	...	10	...	10	...	...	...	N ca	?	?	10	3	5	1	1	...	72	...	61	$4\ 3^{11}$	4^{15}
5	1342	3	1	...	1	1	...	...	...	...	...	...	...	I	...	...	1	...	...	1	...	...	35	4	16	12	1	2^{16}	dy	T	T	2	2	...	...	...	...	25	...	9	7	$3\ 6^{17}$
6	1496	4	1	1	...	1	...	...	...	1	...	...	...	dy	...	...	2	...	2	...	...	...	...	...	...	...	...	...	I	...	...	6	...	6	...	...	...	...	...	...	...	...
7	1754	4	2	...	1	1	...	...	...	...	...	...	...	I	...	...	...	...	...	...	...	...	...	...	...	...	...	...	N	...	...	...	...	...	...	...	...	...	...	...	...	...
8	3431	4	...	...	2	2^{36}	...	...	...	...	...	...	...	Ia	...	...	...	...	...	...	...	...	...	...	...	...	...	...	T	...	...	3	...	2	...	1^{11}	...	4	...	4	...	...	...
9	2347	8	4	...	3	1	...	...	...	...	...	...	...	N ?	...	...	5	...	5	...	...	...	...	...	...	...	...	...	I	...	Ne	1	...	1	...	...	...	71	3	59^{26}	...	4^{11}	5^{27}
10	5521	2	...	...	1	1^{33}	...	...	...	...	...	...	...	N	...	...	5	...	5	...	...	...	...	...	...	...	...	...	I	...	...	6	2	2	...	2	...	12	10	...	...	2^{11}	...
11	XIV	6	...	...	4	1	1	...	...	...	...	...	...	N	...	...	5	...	5	...	...	...	13	3	5	5	...	...	I	...	...	...	...	...	...	...	...	...	...	...	...	...

NOTES.—[1] 1 E 3 F, [2] 1 E 1 F, [3] 1, [4] unknown b-out of wedlock, [5] 1 C, [6] E, [7] ch, [8] P, [9] F, [10] 3 E 4 F, [11] A, [12] d-ca, [13] T, [14] 1 ch, [15] 1 E 2 F, [16] 1 F 1 I, [17] 3 E 3 I, [18] 1 has goître and 9 are T, [19] 1 has goître, [20] 3-T, [21] both A and 1 suicide, [22] 2 E 1 F, [23] 1 ht 1 rh 1 P, [24] M, [25] 1 S 1 rh, [26] 2 are eccentric, [27] 3 F 2 I, [28] 2 T, [29] all died before two years of age in convulsions, [30] also S (acquired), [31] Sx, [32] 1 I, 3 E, 9 F, [33] S also acquired, [34] stubborn, [35] both under 14—father did not develope epilepsy until after 30, [36] 1 E?, * includes miscarriages and stillbirths.

TABLE V.

THE FREQUENCY OF THE DIFFERENT CLASSES OF MENTAL CONDITION IN THE CHILDREN OF PARENTS BOTH OF WHOM SHOW SOME EVIDENCE OF SLIGHT MENTAL WEAKNESS (INCLUDING ALCOHOLISM), TOGETHER WITH THE MENTAL CONDITION OF THE GRANDPARENTS, THE PARENTS' SIBS AND OTHER BLOOD RELATIVES ABOUT WHOM SOMETHING IS KNOWN.

Abbreviations.—A, alcoholic; ap, apoplexy; B, blind; bd, affected with Bright's disease; C, criminalistic; ca, cancerous; cb, childbirth; ch, choreic; cr, cripple; D, deaf; dau, daughter; dfm, deformed; dp, dementia præcox; dt, delirium tremens; dw, dwarf; dy, dropsical; E, epileptic; ecc, eccentric; en, encephalitis; F, feebleminded; f, father; ff, father's father; fm, father's mother; go, gôitre; gp, general paralysis of the insane; ht, heart disease; hy, hysteric; I, Insane; id, ill defined organic disease; kd, kidney disease; la, locomotor ataxia; M, migrainous; m, mother; md, manic depressive insanity; mf, mother's father; mm, mothers' mother; N, normal; Ne, neurotic; np, neuropathic; obs, obesity; P, paralytic; pa, paranoiac; pn, pneumonia; rh, rheumatism; S, syphilitic; sb, softening of the brain; sco, scoliosis; sd, senile dementia; sh, shiftless; sm, simple meningitis; st, stillborn; su, suicide; Sx, unchaste; T, tuberculosis; tf, typhoid fever; tu, tumor; va, varicose veins; ve, vertigo; W, vagrant; ? implies doubt; un, unclassified; d, died.

	Serial No.	Total	Children. d* bef	fe	l4	un	N	E	F	I	M	Ne	A	P	Sx	f	ff	fm	f's sibs. Total	d* bef	fe	l4	un	N	Ne	np	f's other relatives. Total	d* bef	fe	l4	un	N	Ne	np	m	mf	mm	m's sibs. Total	d* bef	fe	l4	un	N	Ne	np	m's other relatives. Total	d* bef	fe	l4	un	N	Ne	np
1	1524	5	...	...	3	1	1	...	...	...	...	...	...	...	...	A Ne	T	...	6	...	...	1	5^{1}	...			28	2	25	...	...	1^{2}		Ne	A	N	9	2	2	5	...	...			12	...	10	2	...	...		
2	2691	4	1	...	2	1	...	...	...	...	...	...	...	...	...	Ne	bd	I^{1}	1	...	...	1	...	...	...		26	...	26^{3}	...	...	...		Ne	ap	M	3	...	...	3	...	...			41	4	33	1	...	3^{5}		
3	2791	5	3	1	...	1	...	...	...	...	...	...	...	...	...	Ne	A	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Ne	...	N d-dy	3	1	1	...	...	...	...	16	...	15	1	...	...		
4	3592	7	1	1	2	2	...	1	...	...	...	...	...	...	...	Ne	...	...	7	...	7	...	...	...	...	...	...	...	...	...	...	...	...	Ne	...	d-ap	3	...	3	...	...	...	...	3	...	...	...	...	^{26}	1^{2}	
5	3951a	4	1	...	1	2	...	...	...	...	...	...	...	...	...	Ne	...	...	2	1	1	...	...	...	2	...	1^{7}	...	2	...	1	...	1^{7}	...	Ne	...	P	8	...	...	7	1	...	...	17	...	11^{7}	...	1^{6}	5^{8}		
6	4286a	2	...	...	...	...	...	...	...	...	2	...	...	...	...	Ne	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Ne	M	M	8	3	...	1	3	1^{2}	...	...	...	...	...	...	...	...	...	
7	4475b	7	...	...	5	1	...	...	...	...	1	...	...	...	...	Ne	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Ne	...	...	4	1	1	...	2	...	...	...	...	...	...	...	...	...	...	
8	1716	5	1	...	2	1	...	...	...	...	...	...	...	...	1	M	A	...	9	...	2	...	4	3^{9}			49	5	39	1	3	1^{9}		M^{10}	A	N D	10	1	3^{10}	5	1	...			50	3	43^{11}	...	...	4^{12}		
9	{XXXVII} {4286}	9	3	...	1	1	...	...	...	4^{13}	...	...	...			M^{14}	...	T	7	...	4	1	2	...			9	...	6	1	...	2^{2}		M-P	d-bd	d-ca	9	...	5	4	...	...			29	...	24	2	2^{15}	1^{2}		
10	2041	7	...	...	...	4	...	...	...	3	...	...	...	...	...	M	T	P	1	...	...	...	1	...			...	...	...	...	...	...		M	P	N	8	...	8	...	...	...			7	...	7	...	...	...		
11	514	6	1	...	2	1	...	...	...	2	...	...	...	...	...	Ne	ht	d P	6	...	3^{16}	3	...	...	48		6	42	...	...	...		M Ne	N	...	8	3	3	2	...	...			34	...	32	...	...	2^{17}		
12	1561a	11	3	1^{18}	1	1	1	...	...	2	2	...	...	...	...	Ne^{18}	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	M	A	E	3	...	...	3^{5}	...	...	...	13	1	7	3^{19}	...	...		
13	2924	4	...	...	...	2	...	...	...	2	...	...	...	...	...	Ne	...	...	5	2	1	...	2^{20}	...			30	2	16	9	3^{21}	...		M Ne	T	ca	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
14	3376	10	1	1	4	1	...	...	...	3^{22}	...	...	...	...	...	Ne	...	...	7	...	6	...	1^{6}	...			7	...	6	...	1^{23}	...		M	N P	...	3	...	...	$1\ 2^{24}$	...			8	...	8	...	...	...		
15	3641	8	6	...	1	1	...	...	...	...	...	...	...	...	...	Ne A	...	...	3	...	3	...	...	...			6	...	6	...	...	...		M	A	M	8	3	...	3	2^{1}	...			12	...	7	5	...	...		
16	4002b	6	...	...	4	...	...	...	...	2^{25}	...	...	...	...	...	M	N	...	5	...	1	3	...	1^{26}			...	...	...	...	...	...		Ne	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
17	2673	8	1	...	3	1	1	...	...	2^{27}	...	...	...	...	...	A T	...	...	7	...	3	2	1	1^{2}			4	...	2	1	...	1^{2}		Ne	...	E	6	3	1	2	...	...			8	3	1	4	...	...		
18	3689	7	4	...	2	1	...	...	...	...	...	...	...	...	...	A Ne	rh	...	7	1	5	...	1^{1}	...			2	...	2	...	...	...		Ne	...	Ne	3	...	1	...	2	...			...	...	...	...	...	...		
19	3171	13	5	...	3	2	...	...	...	3^{25}	...	...	...	...	...	A	A	bd	2	...	...	2	...	...			6	...	4	...	...	2^{28}		Ne	N	N	...	...	...	...	...	...	...	...	2	...	...	2	...	...	...	
20	1084	2	...	1	...	1	...	...	...	...	...	...	...	...	...	A	N	bd	3	...	3	...	...	...			...	...	...	...	...	...		Ne	...	dy	3	3^{29}	...	...	...	...	...	...	2	...	1	1	...	...		
21	1841	10	4	...	5	1	...	...	...	...	...	...	...	...	...	A	A	B ap	...	...	...	...	...	...			7	...	5	...	1	1^{30}		Ne	A dy	ht	6	...	...	5	...	1^{2}			17	4	10	2	...	1^{9}		
22	3211	1	...	...	...	1	...	...	...	...	...	...	...	...	...	A	...	...	1	...	...	...	...	1^{30}			...	...	...	...	...	...		Ne	...	N D	6	...	1	5^{31}	...	...	...		...	...	...	...	...	...		
23	3794	7	2	...	4	1	...	...	...	...	...	...	...	...	...	A	d-T	rh	3	1	...	2	...	...			...	...	...	...	...	...		Ne	A	rh	6	...	1	4	1^{35}	...	...		10	...	9	...	...	1^{9}		
24	4402	9	3	...	3	1	...	...	...	1	1	...	...	...	...	A	...	...	1	1^{11}	...	...	...	...			...	...	...	...	...	...		Ne	...	...	7	1	4	...	2	...	...		19	...	16	...	3^{1}	...		
25	3556	10	5	...	3	1	...	...	...	1	...	...	...	...	...	A	Ne	...	3	1	1	1	...	...			10	...	6	2	2^{1}	...		Ne	...	N	4	...	...	3	1^{1}	...	...		15	...	14	...	...	1^{39}		
26	3921	7	4	...	...	1	...	...	...	2^{33}	...	...	...	...	...	A S	A	M	5	...	...	2	3^{1}	...			8	3	5	...	...	...		M	T	A	4	1	2	...	1^{1}	...	...		2	1	...	...	1^{1}	...		
27	2029	4	...	...	1	1	...	...	...	2^{35}	...	...	...	...	...	A	A	N d T	2	1	...	...	1^{1}	...			86	9	60	10	3	4^{37}		M	...	...	3	...	3	...	...	...	...	...	...	47	4	68^{38}	2	1	2^{37}		
28	1579	14	4	2	7	1	...	...	...	...	...	...	...	...	...	A	A	...	5	...	4	...	1^{1}	...			7	...	6	...	...	1^{2}		M	A	E	10	1	3	3	2	1^{2}			40	6	27	5	...	2^{2}		
29	4912	3	2	...	...	1	...	...	...	...	...	...	...	...	...	A th	...	M P	4	...	...	4	...	...			9	...	...	9	...	...		M Ne	...	d P	5	...	5	...	...	...	...		2	...	1	1	...	...		
30	402a	1	...	...	...	1	...	...	...	...	...	...	...	...	...	ap	rh	...	8	...	6	...	1	1^{36}			5	...	3	2	...	...		Ne	A	N	3	...	3	...	...	...	...		1	...	...	...	1	...		
31	{2016a} {4369a}	4	1^{39}	...	1	1	...	...	...	1	...	...	...	...	...	sm	Ne	T	1	1	...	...	...	...			63	8	32	8	1	14^{40}		Ne	A	N	10	5	3	2	...	...			42	3	23	...	8	8^{1}		
32	3614	11	2	...	3	4	...	1	...	...	1	...	...	...	...	A	I	...	13	1	7	...	4	1^{30}			49	3	41	...	5^{1}	...		hy	...	P	6	1	3	...	2^{1}	...			25	4	16	2	1^{1}	2^{2}		
33	1682	9	3	1	3	1	...	...	...	1	...	...	...	...	...	A bd	...	...	1	...	1	...	...	...			6	...	5	...	...	1^{2}		P	...	dy	4	...	4	...	...	...	...		24	...	24^{10}	...	...	...		
34	1852	8	2	2^{41}	...	3^{43}	...	...	...	1^{41}	...	...	...	...	...	A SX	I^{10}	A	A	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Sx	A	T	2	...	...	2	...	...	...	5	...	1	3	1	...		
35	643a	17	10	1	4	1	...	...	...	1	...	...	...	...	...	A	E	N	4	1	2	1^{23}	...	...			22	...	10	10	...	2^{2}		A	...	...	...	...	...	...	...	...	...	...	...	1	...	1	...	...	...		
36	1162	2	...	...	...	1	...	...	...	1	...	...	...	...	...	A	...	...	1	...	1	...	...	...			2	...	1	...	...	1^{2}		A	...	T	1	...	1	...	...	...	...		10	...	10	...	...	...		
37	2487a	12	2	...	3	1	...	1	...	4^{15}	1	...	...	...	...	P	...	...	4	...	3	...	...	1^{16}			13	...	5	...	3	5^{17}		M	...	...	1	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	
38	242	8	3	...	3	1	...	...	...	1^{35}	...	...	...	...	...	P	...	...	5	...	4^{18}	1	...	...			18	3	15	...	...	...		P	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
39	1872a	12	7	...	3^{19}	1	1	...	...	...	...	...	...	...	...	d-P	B	...	2	...	2	...	...	...			...	...	...	...	...	...		P	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
40	3151	3	...	...	1	1	...	...	...	1	...	...	...	...	...	A	...	...	1	...	1	...	...	...			1	...	...	...	...	...		...	...	...	1	...	1	...	...	...	...		2	...	2	...	...	...		

TABLE V.—*continued.*

	Serial No.	Children. Total	d* bef'e 14	un	N	E	F	I	M	Ne	A	P	Sx	f	ft	fm	f's sibs. Total	d* bef'e 14	un	N	Ne	np	f's other relatives. Total	d* bef'e 14	un	N	Ne	np	m	mf	mm	m's sibs. Total	d* bef'e 14	un	N	Ne	np	m's other relatives. Total	d* bef'e 14	un	N	Ne	np
41	3072	1	...	...	...	1	...	...	...	...	...	...	...	M Sx S	...	...	5	...	5	...	...	...	7	...	7	...	...	...	Sx	...	...	...	...	...	...	...	...	...	...	...	...	...
42	2613	3	...	...	...	1	1	...	...	1^{50}	...	...	...	A Sx T	...	...	1	...	1	...	...	...	...	...	...	...	...	...	A Sx T	T	A Sx	3	...	...	...	2^{51}	...	1	1	...	...	...
43	XXIX	2	...	...	...	1	...	...	...	1^{52}	...	...	...	sh	...	...	2	...	...	2	...	1^{9}	17	...	3	3	...	1^{9}	Ne	...	T	8	3	3	...	2	...	35	3	31^{53}	...	...	1
44	XXI	5	1	1	...	1	...	...	2	...	...	...	...	A Ne	...	...	6	1	5	...	...	...	...	...	...	...	...	...	...	Ne	ht	...	9	2	6	...	1^{1}	...	16	...	16	...	...	...
45	XXXIII	8	4	1	...	1	...	...	...	2^{54}	...	...	...	A	...	...	6	...	6	...	...	...	...	...	...	...	...	...	A	d-ap	M	4	3	...	1	...	...	27	10	14	$2\ 1^{25}$	...	...
46	XVII	7	3	2	1	1	...	...	...	...	...	...	...	M	...	...	6	1	4	1	...	...	3	1	2	...	...	...	Ne	...	Ne	5	2	1	...	2	...	23	8	15	...	...	...
47	5159	9	4	...	3	2	...	...	...	...	...	...	...	A Ne	N?	N?	4	2	...	2	...	...	24	1	2^{265}	...	...	1^{2}	Ne	...	...	7	...	...	7	...	...	8	...	8	...	...	...
48	5137	7	3	2	...	1	...	...	...	1	...	...	...	Sx C A	Sx A	...	3	...	2	...	...	1^{30}	2	1	...	1	...	...	Sx M	...	Sx S M	8	5	1	...	2	...	39	12	19	$5\ 4^{55}$	...	...
49	4736	10	3	2	2	1	...	...	...	2	...	...	...	A	...	...	...	...	...	...	...	...	...	...	...	...	...	...	M	T	P	...	...	...	...	...	...	...	...	...	...	...
50	4726	7	1	3	...	1	...	...	...	2	...	...	...	A	...	...	5	...	5	...	...	...	22	...	21	...	...	1^{1}	M	ht	...	9	1	4	3^{3}	1	...	15	5	7	3	...	...
51	3265^{56}	6	2	3	...	1	...	...	...	...	...	...	...	A	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Ne	...	...	15	4	9	...	2	...	46	6	39	...	...	1^{30}
52	3834	5	3	...	1	1	...	...	...	...	...	...	...	ap	...	...	3	...	1	2	...	...	25	9	16	...	...	...	Sx A	...	...	7	...	6	1	...	...	29	4	22	3	...	...
53	3825	5	...	...	4	1	...	...	...	...	...	...	...	Ne	...	N	12	2	8	2	...	...	18	4	43	1	...	...	Ne	N	N	10	1	2	6	1	...	21	...	6	14	1	...
54	4675	5	2	1	...	1	...	...	...	1	...	...	...	A Ne	I	...	4	1	2	...	1^{1}	...	...	...	...	...	...	...	Ne	bd	ca	14	1	13	...	...	...	...	...	...	...	...
55	4623	3	...	...	...	1	...	...	...	2	...	...	...	A	...	...	...	...	...	...	...	...	...	...	...	...	...	...	M	...	...	5	...	4	1	...	...	...	...	...	...	...
56	4502	3	...	...	1	1	...	...	...	1	...	...	...	A Sx	...	N	10	3	3	4	...	...	27	...	1	26	...	...	M	N	ca	8	4	1	2	1	...	...	...	...	...	...	...
57	{ 504 } b { 3781 }	5	2	...	1	1	...	...	...	1	...	...	...	la	ht	I	4	2	1	...	1	...	11	3	...	7	1	...	Ne	la	h	3	1	2	...	...	...	16	...	16	...	...	...
58	1214	5	1	...	1	1	1	...	...	...	1	...	...	A	...	...	3	...	3	...	...	...	...	...	...	...	...	...	A	...	...	6	...	5	...	1	...	7	1	...	6	...	...
59	1097	9	2	...	...	1	...	...	...	6	...	...	...	Ne	Ne	...	1	...	1	...	...	...	1	...	...	...	...	1^{2}	Ne	...	...	3	...	2	...	1^{1}	...	9	...	4	5	...	...
60	976	9	...	...	2	2	3	...	...	2	...	...	...	A T	A	d-P	11	4	...	2	4	1^{30}	45	7	26^{53}	...	8^{1}	4^{2}	Ne D	I	N	12	7	2	1	2	...	9	1	5	3	...	...
61	1534	6	1	3	...	2	...	...	...	...	...	...	...	Ne	...	...	4	...	3	...	1	...	8	...	8	...	...	...	Ne	ht	ht	6	...	6	...	...	...	15	...	14	...	...	1^{2}
62	2465	5	1	2	...	1	1	...	...	...	...	...	...	A	A	...	1	...	1	...	...	...	5	...	5	...	...	...	Ne	P	D	4	2	1	1	...	...	31	...	30	...	...	1^{9}
63	2245	1	...	...	...	1	...	...	...	...	...	...	...	P	...	...	11	...	11	...	...	...	33	5	27	...	...	1^{9}	Ne	T	M	5	...	4	...	1^{25}	...	58	5	47	2	1	3^{57}
64	2183	7	2	2	...	1	1	...	...	...	...	...	1	A	...	...	4	...	4	...	...	...	1	1	...	...	...	...	M	...	...	4	2	2	...	...	...	6	...	5	...	1^{1}	...
65	2153	6	...	1	2	1	...	1	...	1	...	...	...	A	...	Ne	6	...	6	...	...	...	17	...	17	...	...	...	Ne	...	...	8	...	7	...	1^{1}	...	...	...	...	...	...	...
66	{ 1015 } { 2096 }	12	4	2	4	2	...	...	...	...	...	...	...	A	...	...	11	...	11	...	...	...	...	...	...	...	...	...	Ne	Ne	...	7	...	6	...	1^{58}	...	25	...	...	2	...	2^{59}
67	1995	11	5	1	...	2	1	...	1	1	...	...	...	A	...	...	3	...	2	...	1^{1}	...	4	...	4	...	...	...	M	T	P	4	2	2	...	...	...	10	1	9	...	...	...
68	1945	7	2	1	...	1	...	...	...	3	...	...	...	A-T	...	...	6	...	5^{60}	...	1	...	...	...	...	...	...	...	A	bd	...	...	...	...	...	...	7	...	...	4	...	3^{30}
69	5423	9	4	2	2	1	...	...	...	...	...	...	...	Ne C	A	...	5	3	1	...	1^{25}	...	10	...	10	...	...	...	Ne ?	...	...	1	1	...	...	...	...	...	...	...	...	...
70	5072	7	...	1	4	1	...	...	...	1	...	...	...	Ne ?	...	...	1	...	1	...	...	...	...	...	...	...	...	...	Ne	...	...	4	...	4	...	...	...	...	...	...	...	...
71	5496	3	1	...	...	1	...	...	...	1	...	...	...	A	...	...	1	...	1	...	...	...	...	...	...	...	...	...	Ne	...	...	6	3	3	...	...	...	15	3	11	...	1^{1}	...
72	953	9	...	1	1	1	...	...	...	...	3	3	...	ecc	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Ne	...	...	...	...	...	...	...	...	...	...	...	...	...
73	XX	7	3	...	...	1	2	...	...	1	...	...	...	A T	...	...	4	...	4	...	...	...	...	...	...	...	...	...	Ne ?	...	...	3	...	2	...	1	...	...	...	...	...	...
74	2593	5	1	...	2	1	...	...	...	1	...	...	...	A	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Ne ?	A	D	5	...	5	...	...	...	40	...	38	...	1^{1}	1^{2}
75	4513	11	4	1	5	1	...	...	...	...	...	...	...	A	...	...	...	...	...	...	...	...	...	...	...	...	...	...	d-ap	...	...	2	...	2	...	...	...	9	1	...	...	8	...
76	XIIb	6	1	2	...	1	...	...	...	2	...	...	...	A	...	...	...	...	...	...	...	...	...	...	...	...	...	...	d-ap	...	...	...	...	...	...	...	...	...	...	...	...	...
77	4192a	2	...	1	...	1	...	...	...	...	...	...	...	A	...	...	...	...	...	...	...	...	...	...	...	...	...	...	M	M	M	3	...	...	...	3	...	17	12	...	...	5	...
78	4192b	4	...	...	...	...	...	...	...	3	...	...	1	M	...	...	8	1	7	...	...	...	...	...	...	...	...	...	M	A	M	5	3	...	...	2	...	...	...	...	...	...	...
79	XIIa	11	3	3	...	...	3	...	1	...	1	...	...	A	...	...	...	...	...	...	...	...	...	...	...	...	...	...	A M	...	...	...	...	...	...	...	...	...	...	...	...	...
80	XXXa	1	...	...	...	...	...	...	...	...	...	1^{62}	...	A	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Sx	I	...	...	...	...	...	...	...	...	...	...	...	...
81	2784a	6	2	2	...	2	...	...	...	...	...	...	...	A	...	T	5	...	4^{60}	...	...	1^{2}	1	...	...	...	...	$1\ 0^{1}$	A	...	A	3	...	...	...	2^{1}	1^{30}	1	...	...	...	...	1^{9}
82	406	1	...	...	...	1	...	...	...	...	...	...	...	d-ap	rh	...	8	...	6	...	1	1^{30}	...	...	...	...	...	...	ecc	A	...	3	...	3	...	...	...	...	...	...	...	...	...
83	1983	2	...	...	...	1	...	...	...	1	...	...	...	A	...	...	4	...	4	...	...	...	20	1	1^{60}	...	...	...	Ne	...	...	8	4	3	1	...	...	9	...	6	3	...	...
84	4025	5	2	1	...	1	...	...	...	1^{63}	...	...	...	M	...	...	4	...	3	...	1^{1}	...	19	4	10	3	2	...	—[63]	A	Ne	8	6	...	...	1^{1}	...	23	3	11	$2\ 7^{61}$	...	...

NOTES. — [1] A, [2] F, [3] 1 D 1 T, [4] sd, [5] 2 F 1 I, [6] P, [7] 8 d-T, [8] 3 F 2 I, [9] F, [10] d-cancer, [11] 2 d-cancer, [12] 1 F 3 F, [13] 1 ch, [14] d-bd, [15] 1 A 1 Ne, [16] 1 D 1 rh, [17] 1 F 1 I, [18] rh, [19] 1 P 1 su, [20] 1 ch 1 P, [21] 1 A 1 ch; [22] 1 palsey 1 M 1 P, [23] Sx [24] d-ap, [25] M, [26] F (son of 400 2a), [27] 1 ch 1 M, [28] 1 F 1 I, [29] 2 ht 1 bd, [30] I, [31] 1 D, [32] d-convulsions at 6 mon., [33] 1 M, [34] 2 F 2 F, [35] 1 C, [36] 6 T, [37] 1 F and C, 1 I sd, [38] 1 I 7 F 6 F, [39] simple meningitis, [40] 2 T, [41] S, [42] 1 also C, [44] delirium tremens, [45] spinal trouble, [46] softening of the brain, [47] 1 I 1 F 1 F, [48] 1 d-cancer, [49] 2 d-bd, [50] A and Sx, [51] 1 A 1 Sx, [52] incorrigible, [53] 5 d-T, [54] 1 A 1 M, [55] 1 A 2 M 1 C, [56] This family is otherwise interesting because of its history of cataracts, [57] 1 F 1 I 1 F, [58] is the m in 1015. [59] 1 F 1 F, [60] T, [61] 3 d-T, [62] illegitimate and the f of XXX, [63] Frederick's ataxia, [64] 5 of these have Frederick's ataxia, [65] both tubercular, * includes miscarriages and stillbirths.

TABLE VI.

THE FREQUENCY OF THE DIFFERENT CLASSES OF MENTAL CONDITION IN THE CHILDREN OF PARENTS ONE OF WHOM HAS SOME FORM OF NEUROSIS AND THE OTHER IS *Normal*; TOGETHER WITH THE MENTAL CONDITION OF THE GRANDPARENTS, THE PARENTS' SIBS AND OTHER BLOOD RELATIVES ABOUT WHOM SOMETHING IS KNOWN.

Abbreviations. – A, alcoholic; ap, apoplexy; B, blind; bd, affected with Bright's disease; C, criminalistic; ca, cancerous; cb, childbirth; ch, choreic; cr, cripple; D, deaf; dau, daughter; dfm, deformed; dp, dementia præcox; dt, delirium tremens; dw, dwarf; dy, dropsical; E, epileptic; ecc, eccentric; en, encephalitis; F, feebleminded; f, father; ff, father's father; fm, father's mother; go, goître; gp, general paralysis of the insane; ht, heart disease; hy, hysteric; I, insane; id, ill defined organic disease; kd, kidney disease; la, locomotor ataxia; M, migrainous; m, mother; md, manic depressive insanity; mf, mother's father; mm, mother's mother; N, normal; Ne, neurotic; np, neuropathic; obs, obesity; P, paralytic; pa, paranoiac; pn, pneumonia; rh, rheumatism; S, syphilitic; sb, softening of the brain; sco, scoliosis; sd, senile dementia; sh, shiftless; sm, simple meningitis; st, stillborn; su, suicide; Sx, unchaste; T, tuberculosis; tf, typhoid fever; tu, tumor; va, varicose veins; ve, vertigo; W, vagrant; ? implies doubt; un, unclassified; d, died.

	Serial No.	Children. Total	♂ bef'e 14	♂ un	N	E	F	I	M	Ne	A	P	Sx	f	ff	fm	f's sibs. Total	♂ bef'e 14	♂ un	N	Ne	np	f's other relatives. Total	♂ bef'e 14	♂ un	N	Ne	np	m	mf	mm	m's sibs. Total	♂ bef'e 14	♂ un	N	Ne	np	m's other relatives. Total	♂ bef'e 14	♂ un	N	Ne	np
1	3332	14	10	3	...	1	...	...	...	...	...	...	...	N	...	ht	6	...	5	...	1^{10}	...	14	1	12	...	...	1^{16}	Ne	d-P	...	3	...	3	...	...	...	7	...	6	...	...	1^{10}
2	4576	4	2	...	1	1	...	...	...	...	...	...	...	d-T	N	...	6	...	5	...	1^{51}	...	21	...	16	...	4^{119}	1^{16}	Ne	...	...	...	...	...	...	...	5	...	3	...	...	2^{120}
3	4493	7	...	3	3	1	...	...	...	...	...	...	...	A	...	...	4	...	3	...	1^{56}	...	21	...	20	...	1^{56}	...	N-ht	...	...	3	...	3	...	...	...	5	...	5	...	...	...
4	4437	9	5	2	...	1	...	...	1	...	...	...	...	A	...	...	2	...	2	...	...	...	...	...	...	...	...	...	N	...	ca	6	4	1	1	1^{56}	...	19	...	16	3	...	...
5	2315	6	3	...	1	1	...	...	...	1	...	...	...	N	A	I?	13	...	10	1	2^{66}	...	27	1	23	...	3	...	Ne	...	...	7	...	6	...	1	...	7	1	...	...	...	3^{121}
6	3734	6	1	...	4	1	...	...	...	...	...	...	...	N	...	...	4	2	...	1	1	...	...	...	...	...	...	...	Ne	bd	...	6	2	1	2	...	1^{27}	77	4	60	12	...	1^{10}
7	2865	12	5	...	2	1	...	...	...	4	...	...	...	N	d-ca	...	6	3	1	2	...	...	11	2	3	6	...	...	Ne	rh	ap	6	1	2	1	2^{116}	...	12	1	5	5	...	1^{19}
8	2773	9	7	...	1	1	...	...	...	...	...	...	...	A	...	...	...	...	...	...	...	...	...	...	...	...	...	...	N	...	...	10	6	2	2	...	...	15	2	13	...	...	...
9	2754	9	2	...	4	1	2	...	...	...	...	...	...	N	...	...	7	...	2	5	...	...	27	...	15	12	...	...	M	...	N	7	...	1	6	...	...	17	1	13	3	...	...
10	3234	6	3	...	2	1	...	...	...	...	...	...	...	N	...	I	4	1	1	1	1^{11}	...	5	2	1	1	1	...	Ne	N	...	4	1	3	...	...	...	21	2	14	4	...	1^{16}
11	1839	4	1	...	2	1	...	...	...	...	...	...	...	M	...	M	2	...	...	2	...	...	10	2	2	6	...	...	N	kd	...	6	1	...	2	1^{56}	...	15	5	3	...	6	...
12	1732	8	3	...	3	1	...	...	...	1	...	...	...	N	...	...	8	...	8	...	...	...	6	...	6	...	...	...	Ne	...	M	4	...	4	...	...	...	9	...	8	...	1	...
13	1506	7	3	...	1	1	...	...	...	2	...	...	...	ecc	N?	N?	5	...	5	...	...	...	17	...	46	...	1^{56}	...	N	...	...	4	...	4	...	...	...	15	...	11	4	...	...
14	2234	8	1	1	5	1	...	...	...	...	...	...	...	N	N	D	8	3	2	1	1^{11}	1^{16}	52	12	40	...	4	6^{122}	M	I sd	M	4	1	3	...	...	...	12	2	40	...	...	...
15	1294	7	1	...	4	1	...	...	...	1	...	...	...	A	T	...	5	1	3	...	...	1^{27}	1	...	1	...	...	...	N	...	...	1	...	1	...	...	...	...	...	...	...	...	...
16	1203	4	2	...	1	1	...	...	...	...	...	...	...	Ne	d-P	M	10	1	5	1	2	1^{16}	5	3	...	1	...	1^{27}	d-T	kd	Ne	7	...	7	...	...	...	8	...	8	...	...	...
17	1156	5	1	...	3	1	...	...	...	...	...	...	...	A	...	...	3	...	3	...	...	...	3	...	3	...	...	...	N	...	...	4	2	1	1	...	...	9	...	9	...	...	...
18	1073	4	1	1	1	1	...	...	...	...	...	...	...	Ne	I	d P	4	2	...	1	...	1^{10}	8	...	7	...	...	1^{10}	d T	T	ht	4	...	2	2	...	...	6	1	2	2	...	1^{16}
19	1015 / 2096	5	...	...	2	1	1	...	1	...	...	...	...	N	...	...	14	...	13	...	...	1	33	2	31	...	...	...	M	Ne	...	7	3	3	...	1	...	35	4	27	4	...	...
20	3146	12	3	3	4	1	...	...	1	...	...	...	...	M	I	E	8	2	5	...	...	1^{16}	13	12	29	...	...	2^{123}	N	A	...	12	8	...	2	2	...	15	3	12	...	...	...
21	5586	10	5	4	...	1	...	...	...	...	...	...	...	C	A	S	6	...	4^{124}	...	2	...	1	...	1	...	...	...	N	T	...	2	.	...	1	1^{146}	...	20	6	12	...	...	2^{10}
22	74	5	1	...	3	1	...	...	...	...	...	...	...	Ne	...	...	...	...	...	...	...	...	...	...	...	...	...	...	N	...	...	2	1	1^{125}	...	...	...	12	1	11^{125}	...	...	...
23	354	8	3	...	2	2	1	...	...	...	...	...	...	A	I	E	1	...	1	...	...	...	...	...	...	...	...	...	d-bd	d-bd	N-B	2	1	...	1	...	...	28	2	19	7	...	...
24	281	7	2	1	3	1	...	...	...	...	...	...	...	N	th	...	6	...	6	...	...	...	26	...	26	...	...	...	Ne	...	...	4	...	4	...	...	...	6	...	6	...	...	...
25	224	9	4	1	1	1	...	...	...	...	1	1	...	A	...	...	2	...	1	...	...	1^{16}	...	...	...	...	...	...	N-T	C	...	1	...	1	...	...	...	.	...	...	...	...	...
26	5667	8	4	...	2	1	...	...	...	1	...	...	...	N	...	...	5	...	4	...	...	1^{16}	16	...	16	...	...	...	Ne	N?	N?	7	...	7	...	...	...	15	...	14	...	1	. .
27	5563	7	1	2	1	1	...	...	...	2	...	...	...	N	...	...	3	2	1	...	...	...	10	...	10	...	...	...	Ne	...	...	6	...	5	...	1	...	14	...	14	...	...	...
28	5321	7	4	...	2	1	...	...	...	...	...	...	...	N	...	...	2	...	2	...	...	...	10	...	10	...	...	...	Sx	...	...	...	...	...	...	...	...	...	...	...	...	...	...
29	5312	11	6	1	1	2	...	...	...	1^{8}	...	...	...	N	...	...	3	...	3	...	...	...	...	...	...	...	...	...	M	...	...	9	1	6	...	1^{54}	1^{16}	...	...	...	...	...	...
30	XIII	8	1	2	...	1	...	...	...	...	...	...	...	N	A	bt	7	...	3	...	4^{54}	...	27	2	25	...	...	...	M	Ne	A	12	7	4	3	...	...	10	...	10	...	...	...
31	XVIII	3	...	1	1	1	...	...	...	...	...	...	...	N	...	...	3	...	3	...	...	...	7	...	7	...	...	...	Ne	...	...	4	...	4	...	...	...	11	8	6	...	...	...
32	VIII	8	5	...	2	1	...	...	...	...	...	...	...	N	...	...	7	...	2	3	2	...	33	1	19	13	...	...	M	...	...	6	...	2	...	1^{126}	...	10	...	9	...	...	1^{16}
33	II	2	1	...	...	1	...	...	...	...	...	...	...	N	...	...	1	1	...	...	...	...	...	...	...	...	...	...	Ne	I	T	7	...	4	...	3	...	20	19	...	...	1	...
34	XXXV	4	. .	1	1	1	...	...	...	1	...	...	...	A	A	T	2	. .	...	...	...	2^{16}	1	. .	...	...	1	...	N	A	T	8	1	6	...	1^{16}	...	52	6	41	...	2^{127}	3^{16}
35	4301	10	3	1	5	1	...	...	...	...	...	...	...	N	I	...	5	...	5	...	...	...	7	...	7	...	...	...	n'ralgia	...	...	3	...	3	...	...	...	12	...	12	...	...	...
36	4036	3	1	...	1	1	...	...	...	...	...	...	...	A	A	bd	13	8	2	3	...	...	19	1	16	1	...	1^{16}	N	bd	ht	8	...	1	6	1^{41}	...	55	9	45	1	...	...
37	3042	3	1	1	...	1	...	...	...	...	...	...	...	Ne	...	...	1	...	1	...	...	...	...	...	...	...	...	...	N	...	...	5	...	5	...	...	...	20	4	15	...	1^{54}	...
38	3936	1	2	...	1	1	...	...	...	...	...	...	...	N	P	...	6	...	6	...	...	...	20	...	...	20	...	...	Ne	N	T	...	...	...	...	...	...	3	...	3	...	...	...
39	3882	10	2	...	6	1	...	...	...	1	...	...	...	Ne	...	...	2	...	2	...	...	...	4	...	4	...	...	...	N	...	...	...	...	...	...	...	...	...	...	...	...	...	...
40	5095	5	...	3	1	1	...	...	...	...	...	...	...	N	...	...	3	...	3	...	...	...	36	1	33	...	...	2^{30}	M	...	I	2	...	2	...	...	...	10	...	9	...	1^{54}	...

TABLE VI.—*continued.*

	Serial No.	Children. Total	d* bef'e	14	un	N	E	F	I	M	Ne	A	P	Sx	f	ff	fm	f's sibs. Total	d* bef'e	14	un	N	Ne	np	f's other relatives. Total	d* bef'e	14	un	N	Ne	np	m	mf	mm	m's sibs. Total	d* bef'e	14	un	N	Ne	np	m's other relatives. Total	d* bef'e	14	un	N	Ne	np
41	4942	3	...	...	2	1	...	...	...	...	...	...	...	...	d-T	D	ap	3	...	3	...	...	...	...	6	...	4	...	1	1^{10}	Ne	...	...	8	3	4	1	...	...	25	...	26	...	...	...
42	4925	4	...	...	3	1	...	...	...	...	...	...	...	...	A	A	N	5	1	2	...	2^{54}	...		6	1	1	4	...	...	N	N	N	5	2	2	...	1^{54}	...	11	...	1	10	...	...
43	4612	7	1	5	...	1	...	...	...	...	...	...	...	...	N	...	...	3	2	1	...	...	...	...	2	...	2	...	...	...	Ne	...	M	7	4	2	...	1^{128}	...	4	1	3	...	...	...
44	3726	7	2	1	3	1	...	...	...	...	...	...	...	...	A	...	...	2	2	...	...	...	...	...	38	1	34	...	2^{41}	1^{10}	N	...	...	6	...	6	...	...	...	6	2	4	...	...	...
45	3572	2	...	...	1	1	...	...	...	...	...	...	...	...	N	I	...	1	...	...	1	...	...	...	10	...	10	...	...	...	la	I	...	4	...	3	1	...	...	7	3	1	...	3	...
46	3592	4	1	...	2	1	...	...	...	...	...	...	...	...	Ne	...	I	7	1	5	...	1	...	...	10	3	7	...	...	...	N	...	...	4	3	...	1	...	...	23	...	22	...	...	1^{16}
47	3532	5	1	...	2	1	...	...	...	...	1	...	...	...	A	...	...	1	...	...	1	...	...	...	3	...	...	3	...	...	N	...	...	10	3	1	5	1	...	36	2	14	20	...	...
48	3452	6	2	...	3	1	...	...	...	...	...	...	...	...	Ne	...	kd	8	2	1	5	...	...	...	10	...	10	...	...	...	N	...	N	4	2	1	...	1	...	13	2	6	4	...	1^{10}
49	3361	8	3	...	4	1	...	...	...	...	...	...	...	...	N	...	...	1	...	1	...	...	...	...	...	...	...	...	...	...	A	...	Ne	4	4	...	...	...	...	...	...	...	...	...	...
50	3342	12	4	2	5	1	...	...	...	...	...	...	...	...	A	...	...	2	...	2	...	...	...	...	...	...	...	...	...	...	N	...	...	2	...	2	...	...	...	...	...	...	...	...
51	5114a	15	9	...	4^{123}	1	...	...	...	1	...	...	...	...	A	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	N	...	...	...	...	...	...	...	...	...	...	...	...	...
52	3521	5	...	1	3	1	...	...	...	...	...	...	...	...	N	...	...	5	...	2	2	...	1^{27}		21	...	20	...	...	1^{27}	I sd	...	...	11	...	11	...	...	...	2	...	2	...	...	...
53	3706	4	...	...	3	1	...	...	...	...	...	...	...	...	A^{130}	...	...	4	...	4	...	...	...	...	12	...	12	...	...	...	N?	...	...	4	...	4	...	...	...	...	...	...	...	...
54	4243	8	3	...	3	1	...	...	...	...	1	...	...	...	N?	T	...	4	...	2	...	1	1^{27}		9	...	8	...	...	1^{27}	Ne^{131}	Ne^{131}	Ne	6	...	6	...	...	...	18	...	18	...	...	...
55	4356	3	2	...	...	1	...	...	...	...	...	...	...	...	N	...	...	3	...	1	2	...	...	...	8	...	8	...	...	...	T, Ne?	...	...	4	...	4	...	...	...	...	...	...	...	...
56	5354	10	5	2	2	1	...	...	...	...	...	...	...	...	Ne	...	ht	3	3	...	...	...	...	...	...	...	...	...	...	...	N	...	...	11	1	8	...	2^{54}	...	8	...	8	...	...	...
57	153	6	3	...	2	1	...	...	...	...	...	...	...	...	N	...	...	6	4	...	2	...	...	...	10	...	1	7	1^{54}	1^{27}	P	...	...	1	...	1	...	...	...	...	...	...	...	...
58	392	14	4	3	5	1	1	...	...	...	...	...	...	...	N	...	...	6	...	5	1	...	...	...	...	...	...	...	...	...	Ne?	...	...	10	...	10	...	...	...	...	...	...	...	...
59	413	11	4	1	3	1	1	...	...	...	1	...	...	...	N?	...	...	6	...	6^{132}	...	...	...	...	19	...	18^{133}	...	...	1^{10}	d-ap	d-ap	d-P	6	...	6	...	...	...	16	2	14^{134}	...	...	...
60	4702	9	2	...	1	1	...	...	...	...	2^{128}	2	...	1	N	...	...	3	...	2	...	1^{128}	...	...	18	6	12	...	...	...	A	A	N	5	1	4	...	...	...	7	...	7	...	...	...
61	4213	3	...	...	2	1	...	...	...	...	...	...	...	...	N	A	A	1	...	1	...	...	...	...	50	7	33	4^{6135}	...	...	Ne	T	...	5	...	4	1	...	...	11	1	12^{136}	...	...	...
62	XXXIV	5	1	...	3	1	...	...	...	...	...	...	...	...	A	A	...	9	2	6	...	1^{54}	...	...	34	1	31	...	1^6	1^{27}	N	...	...	5	...	3	1	1	...	15	...	15	...	...	...
63	5556	9	...	1	6	1	...	...	...	...	1	...	...	...	N?	A	...	1	...	1	...	...	...	...	6	...	6	...	...	...	M	...	...	13	...	13	...	...	...	4	...	4	...	...	...
64	1254	6	2	...	1	$1^?$	1	...	...	...	1	...	...	...	N	...	ht	5	...	1	4	...	...	...	9	...	6	3	...	...	Ne	N	...	6	...	3	3	...	...	25	3	16	5	1^{54}	...
65	XXVI	1	...	...	...	1	...	...	...	...	...	...	...	...	A	...	...	1	...	...	...	...	1^{16}	...	...	...	...	...	...	...	N	A	N	6	2	2	2	...	...	22	...	22	...	...	...
66	2134	7	1	...	5	1	...	...	...	...	...	...	...	...	P	A	...	5	...	5	...	...	...	...	16	6	10	...	...	...	N	...	...	8	...	4	2	...	2^{10}	26	7	10	7	...	2^{16}
67	2143	7	4	...	2	1	...	...	...	...	...	...	...	...	d-ap	...	...	1	...	1	...	...	...	...	20	1	17	...	...	2^{16}	N	...	...	3	...	3	...	...	...	1	...	1	...	...	...
68	2956	5	...	...	4	1	...	...	...	...	...	...	...	...	Ne	ca	kd	3	...	2	1	...	...	...	7	...	3	2	2	...	N	kd	rh	11	...	10	...	1	...	...	...	...	...	...	...	...
69	904	2	...	...	1	1	...	...	...	...	...	...	...	...	N?	N	T	2	1	1	...	...	...	...	6	...	5	1	...	...	Ne	N	...	4	1	1	...	2	...	10	3	4	...	2	1^{27}
70	2913	8	1	1	5	1	...	...	...	...	...	...	...	...	d-P	...	...	2	...	2	...	...	...	...	2	...	2	...	...	...	N	...	d-P	7	...	4	3	...	...	28	...	28^{137}	...	...	...
71	2902	2	...	1	...	1	...	...	...	...	...	...	...	...	Ne	...	N	4	1	1	...	2	...	...	49	6	43	...	...	...	N^{125}	...	...	2	...	2	...	...	...	...	...	...	...	...
72	5016a	7	5	...	...	...	$1^?$	...	...	...	...	...	1	...	N	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	M	T	ca	13	6	1	...	6^{138}	...	5	...	4	...	...	1^{16}
73	904a	3	...	...	2	1	...	...	...	...	...	...	...	...	N	...	Ne	1	...	...	...	...	1^{16}	...	5	1	3	1	...	...	Ne	...	...	...	...	...	...	...	...	...	...	...	...	...	...
74	1982	2	...	...	...	1	...	...	...	...	...	1^{142}	...	...	A	...	...	3	...	3	...	...	...	...	20	1	19	...	...	...	N	...	...	9	4	4	1	...	...	9	...	6	3	...	...
75	1745b	8	1	3	2	...	1	...	...	1	...	...	...	...	N	...	S	T	7	...	2^{140}	3	1	...	18	...	16^{141}	...	1	1^{16}	Ne	F, A	ch	6	4	1	...	1	...	338	21	257	8	15^{139}	37
76	1324	6	2	...	3	1	...	...	...	...	...	...	...	...	S	S	T	7	...	2^{140}	3	1	...	18	...	16^{141}	...	1	1^{16}	N	N	N	9	...	1	8	...	...	53	3	45	4	...	1^{16}
77	1561	10	3	1	1	1	1	...	...	2	1	...	...	...	N	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	M	A	E	3	1	...	...	2^{143}	...	13	1	7	32^{141}	...	
78	3814	4	...	1	2	1	...	...	...	...	...	...	...	...	A, T	...	...	3	...	2	...	1^{54}	...	...	27	13	14	...	...	...	N	...	...	...	...	...	...	...	...	...	...	...	...	...	...
79	1664	5	...	1	3	1	...	...	...	...	...	...	...	...	A	...	A	11	...	11	...	...	...	...	...	...	...	...	...	...	N?	...	I	7	...	6	...	...	1^{16}	1	...	...	...	...	1^{16}
80	2884	11	2	7	...	1	...	...	...	...	1	...	...	...	N?	...	...	9	...	9	...	...	...	...	...	...	...	...	...	...	Ne	...	rh	8	...	4	3	1^{54}	...	22	7	12	3	...	...
81	5186	6	3	...	2	1	...	...	...	...	...	...	...	...	sh	...	N	5	...	4	...	1	...	...	26	...	26	...	...	...	N	I	rh	6	...	5	...	1	...	1	...	...	...	...	1^{10}
82	5234	3	1	...	1	1	...	...	...	...	...	...	...	...	Ne	...	M	3	...	...	2	1	...	...	11	...	9	2	...	...	N	...	M	2	...	2	...	...	...	15	...	15	...	...	...
83	552	6	2	...	2	2	...	...	...	...	...	...	...	...	N	...	...	2	...	2	...	...	...	...	4	...	4	...	...	...	P	...	...	...	...	...	...	...	...	...	...	...	...	...	...
84	1703	8	...	3	2	1	...	...	1	1	...	...	...	...	P	A	D	1	...	1	...	...	...	...	...	...	...	...	...	...	N?	T	bd	11	3	3	6	...	...	47	5	38	...	2^{54}	2^{16}
85	1745a	3	1	...	1	1	...	...	...	...	...	...	...	...	A	A	P	3	1	2	...	...	...	...	111	20	77	4	6	4	ca	F, A	ch	6	4	...	...	2	...	338	21	257	8	15^{105}	37^{91}
86	94	5	2	1	1	1	...	...	...	...	...	...	...	...	M	d-ca	d-pn	6	...	1	4^1	1	...	...	18	...	7	9	1^2	1^3	N	d-ap	d-P	2	...	...	2^4	...	...	7	...	5	2	...	...
87	306	2	...	...	1	1	...	...	...	...	...	...	...	...	N cr	...	d-P	2	...	2^5	...	...	...	...	5	...	3	1	1^6	...	M	Ne	T	3	...	2	1	...	...	13	...	10	...	...	37
88	674	3	2	...	...	1	...	...	...	...	...	...	...	...	N	A	N	1	...	...	1	...	...	...	30	3	12^{12}	15	...	...	M	I	d-bd	4	...	2	...	2^{18}	...	54	...	41^{17}	7	5^{15}	1^{16}
89	1147	10	6	...	1	1	...	...	2^{18}	...	...	...	...	...	N^{19}	I^{20}	...	6	2	3	...	1^{21}	...	...	9	2	6	...	1	...	M	...	...	6	...	6	...	...	...	2	...	2	...	...	...
90	1435	7	...	1	5	1	...	...	...	...	...	...	...	...	d-bd	d-P	...	6	...	...	5	...	1^{22}	...	29	...	22	5	...	2^{23}	Md-P	...	...	4	...	4^{21}	...	...	...	13	3	9	...	1	...
91	4096a	12	...	...	11	1	...	...	...	...	...	...	...	...	Nd-bd	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	M	...	...	...	...	...	...	...	...	...	...	...	...	...	...

TABLE VI.—*continued.*

	Serial No.	Children. Total	d* bef'e	14 un	N	E	F	I	M	Ne	A	P	Sx	f	ff	fm	f's sibs. Total	d* bef'e	14 un	N	Ne	np	f's other relatives. Total	d* bef'e	14 un	N	Ne	np	m	mf	mm	m's sibs. Total	d* bef'e	14 un	N	Ne	np	m's other relatives. Total	d* bef'e	14 un	N	Ne	np
92	194b	2	...	...	1^{25}	...	...	...	...	1^{26}	...	...	...	ch	...	d-P	4	...	3	1^{25}	...	...	11	...	9	...	...	2	N	...	...	10	...	3	7	...	...	18	...	7	10	...	1^{27}
93	145	11	...	6	3	2	...	...	...	...	...	...	...	Ne	Ne	...	8	...	7	...	1^{28}	...	7	...	7^{29}	...	...	...	d-tf	...	d-id	8	...	6	...	1^{28}	1^{30}	10	...	6	2	...	2^{31}
94	167a	8	2	1	4	1	...	...	...	...	...	...	...	N	ecc W	N	1	...	...	1	...	...	...	...	...	...	...	...	Ne	d-T	1^{20}	6	...	4^{32}	2	...	...	11	...	5^{33}	6	...	...
95	335	7	...	1	3	1	2	...	...	...	...	...	...	Ne^{34}	...	...	3	...	3^{35}	...	...	...	7	...	1	1	3^{36}	2^{37}	N D	...	...	1	...	...	...	...	...	23	...	8	11	...	4^{38}
96	346a	12	2	4	4	1	...	...	...	1	...	...	...	N d-bd	d-su	...	8	...	4	...	4^{39}	...	4	...	3	...	1^{40}	...	Ne	d-T	D-rh	5	...	$2\,3^{41}$	...	...	...	20	...	16	4	...	...
97	1132	4	2	...	...	1	...	...	...	1	...	...	...	N	Ne	d-T	4	...	4	...	...	...	3	...	3	...	...	...	Ne	...	...	...	...	...	...	...	...	6	...	6^{42}	...	...	...
98	1189	4	2	...	...	1	...	...	...	1^{43}	...	...	...	Ne	A	d-T	3	...	...	$2\,1^{44}$	...	...	14	...	7	6	...	1^{45}	N-cr	...	...	...	...	...	...	...	...	...	...	...	...	...	...
99	1451	8	2	1	3	2	...	...	...	...	...	...	...	d-ca	A	...	5	...	1	2	1^{46}	...	12	...	11	...	...	1^{47}	Ne	rh	...	9	3	4	1	1	...	31	...	30	...	1^{48}	...
100	1906	1	...	...	...	1	...	...	...	...	...	...	...	N?	...	...	2	...	2	...	...	...	...	...	...	...	...	...	Ne	...	N	8	4	1	2	1	...	13	2	8	3	...	...
101	2226	5	2	...	2	1	...	...	...	...	...	...	...	N?	...	...	4	...	4	...	...	...	11	...	11	...	...	...	Ne	...	...	5	...	5^{49}	...	...	...	6	...	1	5	...	...
102	2375	3	1	...	1	1	...	...	...	...	...	...	...	N?	d-ap	...	7	2	5	...	...	...	11	...	8	...	2^{50}	1^{51}	Ne	...	...	2	1	...	1	...	...	22	...	20	2	...	...
103	504 / 3781	5	...	2	1	1	...	...	...	1	...	...	...	N?	N	I	4	...	...	3	1	...	62	...	4	41	11	6^{52}	Ne^{53}	d-la	d-ht	3	...	1	2	...	...	15	...	11	3	1	...
104	3624	3	...	...	2	1	...	...	...	...	...	...	...	N	...	...	5	...	4	...	1^{54}	...	10	...	7	2	1^{54}	...	Ne	...	...	2	...	2	...	...	...	38	2	34	...	...	2^{55}
105	4589	3	...	...	1	1	...	...	...	1	...	...	...	N rh	d-ca	...	2	...	1	...	1^{56}	...	23	1	17	...	3^{56}	2^{57}	Ne	...	I	7	...	4	$2\,1^{56}$	...	69	13	43^{59}	10	3^{58}	...	...
106	314a	4	1	...	1	1	...	...	...	1	...	...	...	d-ap	...	...	6	...	5	...	d-P	...	15	...	3^{61}	$1^{2\,63}$	...	...	N	d-P	...	6	...	5^{63}	...	1	...	...	...	...	...	...	...
107	314b	5	...	2	3	...	...	...	...	...	...	...	...	d-ap	...	...	6	...	5^{61}	...	d-P	...	15	...	3^{65}	$1\,2^{66}$	...	...	N	...	...	2	...	...	...	2^{67}	...	8	...	1	5	...	2^{68}
108	1705	8	1	...	2	1	...	...	...	3	...	1	...	d-P	A	d-P	1	...	...	1^{69}	...	...	...	...	...	...	...	...	N	N	d-bd	11	4	1	6	...	...	46	7	30	5	2^{70}	
109	2557	3	...	...	$2\,1^{71}$	...	...	...	...	...	...	...	...	N	...	...	6	...	4^{72}	2	...	...	31	...	28	$2\,1^{73}$	...	d-ap	...	...	5	...	...	5	...	...	18	...	16	2	...	...
110	402b	3	...	2	1	...	...	...	...	...	...	...	...	d-ap	d-rh	...	8	...	6	...	$1\,1^{74}$	6	...	3	2	...	1	N	...	...	...	...	...	...	...	...	...	...	...	...	...	...
111	83	5	1	1	...	1	...	...	...	2	...	...	...	B	d-P	va	4	...	...	3	...	1	3	...	...	3^{75}	...	...	P rh	A	...	5	...	1	4	1	...	2	...	...	...	2	...
112	1475	1	...	...	...	1	...	...	...	...	...	...	...	N?	?N	d-P	5	1	...	3	...	...	12	6	...	6	...	...	Sx	A	d-P	8	3	...	...	4^{76}	1^{77}	4	3	...	1	...	...
113	481	5	1	...	2	1	1	...	...	...	...	...	...	A	...	...	7	...	1	5^{78}	1	...	25	...	21	1	2	1	N?	d-P	d-T	8	...	2^{79}	4	1	1^{80}	10	...	2	8	...	...
114	1006	3	...	...	1	1	...	...	...	1	...	...	...	A	I	E	2	1	...	...	1	...	42	...	26^{85}	9	2^{86}	5^{87}	N	...	...	4	...	4	...	...	...	43	...	35^{88}	5	3	...
115	1044	1	...	...	...	1	...	...	...	...	...	...	...	A	...	...	3	...	2	...	1^{89}	...	...	...	...	...	...	...	d-T	d-T	...	3	...	3^{90}	...	...	...	14	...	6	7^{91}	1	...
116	1561b	4	...	...	3	1	...	...	...	...	...	...	...	A	Ne	M	10	3	1	1	$3\,2^{92}$		34	3	20	7	3	1	N	...	...	5	...	...	...	...	...	...	...	...	...	...	...
117	2193	5	1	...	2	2	...	...	...	...	...	...	...	A,Sx	...	...	2	...	2	...	...	...	...	...	...	...	...	...	N cr	A	rh	3	...	...	...	$2\,1^{95}$		29	7	9	10	$1\,2^{93}$	
118	2431	4	...	...	3	1	...	...	...	...	...	...	...	A	A	d-dy	3	...	...	2	...	1^{96}	8	...	8	...	...	...	N	A	...	6	...	1	4	1	...	10	...	6	2	...	2^{97}
119	2892	10	1	...	8	1	...	...	...	...	...	...	...	A	A	...	5	1	2^{98}	...	2^{99}	...	3	...	...	3	...	...	N	...	...	6	2	2	2	...	...	10	...	...	10	...	...
120	3274	9	4	...	1	1	2	...	...	1	...	...	...	A	...	...	3	...	2	...	1	...	13	...	13	...	...	...	d-cb	...	...	2	...	1^{100}	...	1^{101}	...	10	...	9	...	1^{102}	...
121	3391	4	1	...	...	1	...	...	...	2	...	...	...	A,Ne	A	...	5	...	1	$1\,3^{103}$	...	...	11	...	8	...	3	...	N	d-ca	...	3	1	...	2	...	...	6	2	4	...	...	...
122	3771	12	5	...	4	2	...	...	...	1	...	...	...	A	...	d-en	6	1	...	4	1	...	22	2	5	15	...	...	N	bd	M	6	1	2	$2\,1^{104}$	...	...	11	2	1	8	...	...
123	3846	10	2	...	5	1	...	...	...	1	1	...	...	A^{106}	...	...	6	...	4	1	1^{107}		20	2	8	10	...	...	N	...	...	...	...	...	...	...	...	8	1	8^{108}	...	...	...
124	4262	5	1	2	1	1	...	...	...	...	...	...	...	A	...	...	2	...	...	2^{109}	...	...	8	...	6	...	2^{109}	...	N	...	...	7	...	7	...	...	...	17	...	17	...	...	...
125	4371	5	1	...	2	1	...	...	...	1	...	...	...	A	...	...	1	...	...	...	1	...	74	8	34	$28\,1^{110}$	3^{111}		112	d-ca	d-T	1	...	...	1	...	...	10	...	7	2	...	1^{113}
126	4475a	5	...	...	1	1	...	...	...	3	...	...	...	A	d-T	I	2	...	1	...	1^{114}	...	12	...	12	...	...	...	d-ca	...	...	4	1	...	...	3^{115}	...	20	...	18	...	$1\,1^{116}$	
127	4552	10	5	2	...	2	...	...	...	1	...	...	...	A	...	...	3	...	2	...	1^{117}	...	14	...	14	...	...	...	N	...	...	7	...	6	...	1^{118}	...	7	...	7	...	...	...

NOTES.—[1] D, [2] ap, [3] sb, [4] 2 T, [5] 1 rh, [6] d-p, [7] 2 E, 1 F, [8] criminalistic, [9] l-cr, [10] I, [11] M, [12] 1 d-ca, 1 obs, 1 T, 1 A, [13] Ne, [14] 1 D, [15] 2 A, 1 M, 2 Ne, [16] E, [17] 4 bd, 1 sm, [18] 1 M, 1 Ne, [19] sh, [20] sd, [21] vertigo, [22] E, [23] 1E, 1 I, [24] 1 ca, [25] T, [26] ch, [27] F, [28] d-P, [29] all d-T, [30] F, [31] 1 E, 1 F, [32] 1 T, [33] l d-sm, [34] attempted suicide, [35] l disappeared, [36] 2 A, [37] d-dt, [38] 1 E, 3 F, [39] 3 I, 1 su, [40] I, [41] 1 ca, [42] 4 B, [43] unstable, [44] d-p, [45] E, [46] I, [47] F, [48] ch, [49] D, [50] P, [51] F, [52] 3 E, 1 F, 2 I, [53] also rh and la, [54] A, [55] 1 I, 1 E, [56] A, [57] 1 E, 1 F, [58] 2 A, ne, [59] 2 d-cancer, [60] 3 d, bd, [61] 1 d-ca, [62] B, [63] 4 d-dy, [64] 3 d-bd, [65] 1 d-ca, [66] B, [67] 2 d-p, [68] 1 E, 1 F, [69] rh, [70] E, [71] appeared at 12 years after a fall from a tree, traumatic?, [72] 1 d-ca, [73] A, [74] I, [75] all d-cancer, [76] 3 A, 1 d-p, [77] I, [78] mostly little known, 1 D. [79] 2 T, [80] F, [81] 3 A, 1 C, [82] I, [83] Ne, [84] P, sm, [85] 1 D, [86] A, [87] 2 E, 1 F, 1 I, [88] 2 B, 1 D, 2 d-ca, [89] E, [90] 1 in Soldier's Home. [91] 1 rh, [92] 1 E, 1 F, [93] 1 E, 1 I, [94] 1 I, 5 E, 31 F, [95] I, [96] I, [97] F, [98] 2 d-cancer, [99] A, [100] dfm, [101] A, [102] C, [103] A, [104] A, [105] 12 A, 1 ch, [106] ca, [107] sd, [108] 1 d-ap, 1 dy, [109] A, [110] A, [111] 1 E, 1 F, 1 I, [112] d pn at birth of E child, [113] F, [114] d-ap, [115] 1 A, 1 M, 1 Ne, [116] E, [117] M, [118] A, [119] 1 A, 1 su, [120] 1 I, 1 F, [121] 2 I, 1 F, [122] 3 E, 1 F, 2 I, [123] 2 E, [124] 2-S, [125] cancer, [126] 2 A, 2 sx, [127] 1 A, 1 P, [128] su, [129] 3 T, [130] bad temper, [131] palsey, [132] 2 d-ap, [133] 3 d-T, [134] 6 d-T, [135] 1 M, 5 A, [136] 2 T, [137] 6 T, [138] 5 M, [139] 12 A, 1 ch, [140] T, [141] 3 T, [142] d apoplexy, [143] 1 P, 1 M, [144] 1 A, 1 su. * Includes miscarriages and stillbirths

TABLE VII.

The Frequency of the Different Classes of Mental Condition in the Children of Parents both of Whom are Mentally Normal but have Produced One or More Epileptics; together with the Mental Condition of the Grandparents, the Parents' Sibs and other Blood Relatives about Whom Something is Known.

Abbreviations.—A, alcoholic; ap, apoplexy; B, blind; bd, affected with Bright's disease; C, criminalistic; ca, cancerous; cb, childbirth; ch, choreic; cr, cripple; D, deaf; dau, daughter; dfm, deformed; dp, dementia præcox; dt, delirium tremens; dw, dwarf; dy, dropsical; E, epileptic; ec, eccentric; en, encephalitis; F, feebleminded; f, father; ff, father's father; fm, father's mother; go, gôitre; gp, general paralysis of the insane; ht, heart disease; hy, hysteric; I, insane; id, ill defined organic disease; kd, kidney disease; la, locomotor ataxia; M, migrainous; m, mother; md, manic depressive insanity; mf, mother's father; mm, mother's mother; N, normal; Ne, neurotic; np, neuropathic; obs, obesity; P, paralytic; pa, paranoiac; pn, pneumonia; S, syphilitic; sb, softening of the brain; sco, scoliosis; sd, senile dementia; sh, shiftless; sm, simple meningitis; st, stillborn; su, suicide; Sx, unchaste, T, tuberculosis; tf, typhoid fever; tu, tumor; va, varicose veins; ve, vertigo; W, vagrant; ? implies doubt; d, died; un, unclassified.

	Serial No.	Children. Total	Children. d* before 14	un	N	E	F	I	M	Ne	A	P	Sx	f	ff	fm	f's sibs. Total	d* bef'e 14	un	N	Ne	np	f's other relatives. Total	d* bef'e 14	un	N	Ne	np	m	mf	mm	m's sibs. Total	d* bef'e 14	un	N	Ne	np	m's other relatives. Total	d* bef'e 14	un	N	Ne	np
1	874	6	1	...	2	1	...	...	...	2^{19}	...	...	...	N	...	...	7	...	2	4	1	...	28	...	13	14	...	1^{52}	N	...	...	11	4	5	...	1^4	1^5	17	...	15	...	2^{53}	...
2	273	7	2	1	2	1	...	...	...	1	...	...	...	N	...	...	...	...	...	...	...	...	...	...	...	...	...	...	N	...	...	8	4	3	...	...	1^5	4	...	...	3	1^{22}	...
3	216	2	...	1	...	1	...	...	...	...	...	...	...	N	...	Ne	4	...	4	...	...	...	11	...	10	...	...	1^5	N	...	...	...	...	...	...	...	...	...	...	...	...	...	...
4	176	12	7	4	...	1	...	...	...	...	...	...	...	N	d-ap	d-ap	8	...	8	...	...	...	9	...	9	...	...	...	N	d-ap	d-dy	13	7	6	...	...	...	10	2	...	8	...	...
5	XXVII	12	5	...	6	1	...	...	...	...	...	...	...	N	...	...	9	...	9	...	...	...	25	10	14	...	1^{10}	...	N	...	d-ca	7	1	4	...	1^4	1^5	8	...	...	8	...	...
6	4683	4	...	...	3	1	...	...	...	...	...	...	...	N	...	...	5	...	5	...	...	...	12	...	10	1^{54}	...	...	N	...	...	9	...	9	...	...	...	37	5	...	31	...	1^5
7	IV	9	4	...	4	1	...	...	...	...	...	...	...	N	...	...	1	...	1	...	...	...	5	...	5	...	...	...	N	...	...	6	...	6	...	...	...	8	...	...	7	...	1^2
8	XXXVI	1	...	...	...	1	...	...	...	...	...	...	...	N	...	...	4	...	2	1	...	1^7	...	...	...	...	...	...	N	...	...	...	...	...	...	...	...	...	...	...	...	...	...
9	5621	3	1	1	...	1	...	...	...	...	...	...	...	N	...	...	6	...	5	1	...	...	4	...	4	...	...	...	N	...	...	5	1	2	2	...	...	15	1	...	13	1^{10}	...
10	5332	2	1	...	...	1	...	...	...	...	...	...	...	N	A	ca	3	...	1	2	...	...	43	9	27	4	3^4	...	N	...	...	3	...	3	...	...	...	1	...	...	...	...	1^7
11	5206	4	1	2	...	1	...	...	...	...	...	...	...	N	kd	d-bd	...	11	5	6	...	...	...	20	1	18	...	...	1^2	N-T	A	...	2	...	2	...	...	...	1	...	...	1^1	...
12	5023	12	4	...	7	1	...	...	...	...	...	...	...	N	T	...	ca	7	...	7^{56}	...	...	...	13	1	11	...	1^{55}	...	N	ht	...	3	...	3	...	...	...	27	...	26	...	1^{55}	...
13	4856	4	2	...	1	1	...	...	...	...	...	...	...	N	?	n'ralg	a	...	5	...	5	...	...	...	4	...	4	...	...	...	N	(d ca)	...	4	...	4	...	...	...	5	...	5	...	...	...
14	4843	8	5	...	2	1	...	...	...	...	...	...	...	N	...	...	4	...	4	...	...	...	...	...	...	...	...	...	N	...	...	11	3	8	...	...	...	30	...	30	...	...	...
15	4692	5	1	3	...	1	...	...	...	...	...	...	...	N	...	su	...	1	...	1	...	...	...	2	...	2	...	...	...	N	A	...	7	7	...	...	...	...	...	...	...	...	...	...
16	4563	6	1	1	3	1	...	...	...	...	...	...	...	N	...	d-ca	8	1	6	...	1^4	...	10	1	8	1	...	...	N	...	...	4	...	1	3	...	...	7	...	5	2	...	...
17	4542	9	4	1	3	1	...	...	...	...	...	...	...	(dT)N		d-T	d-T	5	3	...	...	2^1	...	20	...	20	...	...	...	N	...	...	...	...	...	...	...	...	...	...	...	...	...	...
18	4446	9	2	1	3	1	...	...	1	1	...	...	...	N	...	...	...	8	...	7	...	1	...	7	...	6	...	...	1^2	N	...	I	9	...	9	...	...	...	19	...	19	...	...	...
19	4293	4	1	...	2	1	...	...	...	...	...	...	...	N	...	...	...	4	...	4	...	...	...	9	...	9	...	...	...	N	...	...	7	1	6	...	...	...	5	...	5	...	...	...
20	4162	8	2	...	5	1	...	...	...	...	...	...	...	N	...	...	...	4	...	4	...	...	...	4	...	4	...	...	...	N	...	...	1	...	1	...	...	...	...	...	...	...	...	...
21	4052	9	7	...	1	1	...	...	...	...	...	...	...	N	...	...	...	3	...	1	2	...	...	4	...	2	2	...	...	d-T.N	N-d-T	...	8	...	2	5	1	...	66	10	53	3	...	...
22	3965	4	1	...	2	1	...	...	...	...	...	...	...	N	...	...	12	1	9	2	...	...	10	...	10	...	...	...	N	...	...	5	2	1	2	...	...	2	...	2	...	...	...
23	3862	3	...	...	2	1	...	...	...	...	...	...	...	N	(d bd)	...	...	10	...	10	...	...	...	5	1	4	...	...	...	N	...	d P	4	...	2	...	1^{51}	1^5	25	1	23	...	...	1^5
24	3742	3	...	...	1	1	...	...	...	1	...	...	...	N	A	...	6	...	6	...	...	...	20	...	20	...	...	...	N	...	...	7	...	7	...	...	...	...	...	...	...	...	...
25	3604	11	4	5	1	1	...	...	...	...	...	...	...	N	N	...	6	...	4	2	...	...	14	2	11	1	...	...	N	I	...	...	...	...	...	...	...	...	...	...	...	...	...
26	3281	6	...	2	3	1	...	...	...	...	...	...	...	N	...	...	1	...	1	...	...	...	...	...	...	...	...	...	N	...	...	6	1	3	1	1^4	...	11	...	11	...	...	...
27	3252	6	...	2	3	1	...	...	...	...	...	...	...	N	A	...	4	2	...	1	1^4	...	10	...	4	5	1^4	...	N	N	...	4	2	1	1	...	...	26	5	...	20	1^4	...
28	3204	4	1	...	2	1	...	...	...	...	...	...	...	N	Ne	E?	6	4	...	2	...	...	19	7	12	...	...	...	Nd-T	...	...	4	...	4	...	...	...	7	...	7	...	...	...
29	3126	10	1	3	5	1	...	...	...	...	...	...	...	N	...	...	5	...	5	...	...	...	15	...	15	...	...	...	N	...	...	10	...	10	...	...	...	27	...	27	...	...	...
30	3114	4	2	...	1	1	...	...	...	...	...	...	...	N	(dT)	...	3	2	...	...	1^1	...	5	...	5	...	...	...	N	...	...	3	...	2	1	...	...	10	...	10	...	...	...
31	2996	1	...	...	...	1	...	...	...	...	...	...	...	N	...	...	5	...	3	2	...	...	20	...	20	...	...	...	Nd-T	...	E	3	...	1	...	1^3	1^7	3	...	3	...	...	...
32	2713	2	...	...	1	1	...	...	...	...	...	...	...	N	...	...	7	...	5	1	1	...	26	...	24	1	...	1^2	N	...	...	10	...	7	1	2^1	...	11	2	11	1	...	...
33	2394	6	...	...	5	1	...	...	...	...	...	...	...	N	...	N	4	...	1	3	...	...	17	...	17	...	...	...	N	...	Isd	9	5	2	...	2	...	40	9	27	2	...	2^2
34	2173	4	...	...	3	1	...	...	...	...	...	...	...	N	...	...	3	...	3	...	...	...	...	...	...	...	...	...	N	...	...	8	4	4	...	...	...	11	...	11	...	...	...

TABLE VII.—*Continued.*

	Serial No.	Children. Total	d* before	14	un	N	E	F	I	M	Ne	A	P	Sx	f	ff	fm	f's sibs. Total	d* bef'e	14	un	N	Ne	np	f's other relatives. Total	d* bef'e	14	un	N	Ne	np	m	mf	mm	m's sibs. Total	d* bef'e	14	un	N	Ne	np	m's other relatives. Total	d* bef'e	14	un	N	Ne	np
35	2056	5	3	...	1	1	...	...	...	...	...	...	...	...	N	...	N	6	...	...	6	...	...		104	9	94^{57}	...	...	1^{2}		N	A	T	6	...	3	3	...	...		21	1	20	...	...	. .	
36	1924	6	1	...	4	1	...	...	...	...	...	...	...	...	N	...	...	9	4	4	1	...	...		22	3	16	...	1^{4}	2^{7}		N	...	...	10	1	8	1	...	...		30	2	28	...	...	...	
37	1885	5	3	...	1	1	...	...	...	...	...	...	...	...	N	...	...	3	...	1	...	1	1^{5}		15	6	7	...	...	2^{5}		N ?	T	T	4	1	1	2	...	...		7	2	5	...	...	...	
38	1423	7	...	2	...	1	...	1	2	1	...	...	...	...	N?	...	...	7	...	5	...	1^{4}	1^{6}		16	...	14	...	...	2^{58}		N ?	...	d-ca	5	...	5^{59}	...	...	...		13	4	7^{60}	...	2^{4}	...	
39	1331a	7	...	3	1	1	...	...	...	...	2	...	...	...	N	M	...	8	...	6	...	1	1^{5}		121	6	95	...	8^{61}	12^{62}		N	T	Ne	5	...	2	1	2^{63}	...		24	1	21	...	...	2^{2}	
40	3312	6	2	1	2	1	...	...	...	...	...	...	...	...	N	...	...	...	...	...	...	...	...		...	...	...	...	...	...		N	...	...	5	...	5	...	...	...		18	...	17	...	1^{54}	...	
41	5483	5	1	1	2	1	...	...	...	...	...	...	...	...	N^{35}	...	...	6	1	...	5	...	...		14	2	...	12	...	...		N	ht	N	10	4	2	4	...	...		17	2	4	11	...	...	
42	5604	8	5	1	...	1	...	...	1	...	...	...	...	...	N	...	...	7	4	1	1	...	1^{5}		2	...	2	...	...	...		N ?	...	ca	5	1	2	1	...	1^{7}		8	...	8	...	...	...	
43	2701	5	...	2	2	1	...	...	...	...	...	...	...	...	N?	A	M	3	...	3	...	...	...		5	...	5	...	...	...		N ?	N	...	5	...	5	...	...	...		...	...	...	...	...	...	
44	5452	6	3	...	2	1	...	...	...	...	...	...	...	...	N?	...	T	6	...	6	...	...	...		6	...	6	...	...	...		N	...	...	9	2	4	1	2	...		44	2	42	...	...	...	
45	1716a	7	2	4	...	1	...	...	...	...	...	...	...	...	N	...	...	...	...	...	...	...	...		...	...	...	...	...	...		N	A	D	10	1	2	5	2^{54}	...		14	...	12	...	14	1^{2}	
46	3912a	8	...	2	...	...	1	...	1	...	4	...	...	...	N	...	...	...	...	...	...	...	...		...	...	...	...	...	...		N	...	...	...	...	...	...	...	...		...	...	...	...	...	...	
47	1435a	5	...	...	4	1	...	...	...	...	...	...	...	...	N	...	...	5	...	3	...	...	2^{61}		...	...	...	...	...	...		N	...	...	...	...	...	...	...	...		...	...	...	...	...	...	
48	145a	3	...	...	2	1	...	...	...	...	...	...	...	...	N	d-P	d-P	3	...	3	...	...	...		7	...	5	...	1^{10}	1^{5}		N	...	...	...	...	...	...	...	...		...	...	...	...	...	...	
49	1073a	4	1	...	2	1	...	...	...	...	...	...	...	...	N	T	ht	4	...	4	...	...	...		3	...	2	...	1^{10}	...		N	...	...	...	...	...	...	...	...		...	...	...	...	...	...	
50	1524a	2	...	...	1	1	...	...	...	...	...	...	...	...	N	...	...	...	...	...	...	...	...		...	...	...	...	...	...		N	d-P	...	6	...	...	...	6^{4}	...		...	...	...	...	...	...	
51	975	4	...	3	...	1	...	...	...	...	...	...	...	...	N	...	...	...	...	...	...	...	...		...	...	...	...	...	...		N	A	d-P	12	4	...	2	5^{65}	1^{7}		10	...	5	...	3	2^{5}	
52	835	1	...	...	...	1	...	...	...	...	...	...	...	...	N	...	...	...	...	...	...	...	...		...	...	...	...	...	...		N	E	...	7	4	...	1	...	2^{5}		23	8	12^{66}	1	1^{4}	1^{2}	
53	1574a	5	...	4	...	1	...	...	...	...	...	...	...	...	N	A	E	10	...	2	3	4^{67}	1^{5}		10	9	...	...	...	1^{2}		N	...	...	...	...	...	...	...	...		...	...	...	...	...	...	
54	194a	2	...	...	1	1	...	...	...	...	...	...	...	...	N	?	d-P	4	...	3	...	1^{1}	...		11	...	9	...	...	2^{2}		N	?	?	10	...	3	7	...	...		18	...	7	10	...	1^{2}	
55	643b	10	...	3	5	2	...	...	...	...	...	...	...	...	N	...	...	...	...	...	...	...	...		...	...	...	...	...	...		? N	?	?	...	...	...	...	...	...		16	...	6	8	1^{4}	1^{5}	
56	914	8	...	2	5	1	...	...	...	...	...	...	...	...	N	...	...	3	...	3	...	...	...		6	...	4	2	...	...		N	...	...	4	...	3	...	1^{6}	1		1	...	1	...	...	...	
57	936	5	...	1	2	1	...	...	...	1	...	...	...	...	N	...	...	2	...	...	?2	...	...		9	...	8	...	...	1^{7}		N	N^{8}	N^{9}	1	...	1	...	...	...		30	...	29^{10}	...	...	...	1^{7}
58	1115	10	2	2^{11}	5	1	...	...	...	...	...	...	...	...	N	...	...	1	...	...	1	...	...		...	...	...	...	...	...		N	...	...	...	...	...	...	...	...		11	...	8	2	...	1^{12}	
59	1261a	14	4	...	8	1	1	...	...	...	...	...	...	...	N	...	...	1	...	...	...	1^{13}	...		...	...	...	...	...	...		N	...	...	9	...	9	...	...	...		...	...	...	...	...	...	
60	1324b	6	2	...	3	1	...	...	...	...	...	...	...	...	N	...	...	...	...	...	...	...	...		...	...	...	...	...	...		N	N	N	9	...	...	9	...	...		44	4	30	8	...	2^{14}	
61	1356	6	3	1^{15}	...	1	...	...	...	...	1	...	...	...	N	N	N	6	...	...	6	...	...		15	7	1	7	...	...		N^{15}	...	...	4	...	4	...	...	...		10	...	9	...	...	1^{16}	
62	1445	4	1	1	1	1	...	...	...	...	...	...	...	...	N	...	...	6	...	5	...	...	1^{17}		...	...	...	...	...	...		N	...	...	8	...	8	...	...	...		...	...	...	...	...	...	
63	1541a	8	1	...	4	1	...	...	...	...	1	1	...	...	N^{18}	...	...	...	...	...	...	...	...		...	...	...	...	...	...		N	...	...	1	...	1	...	...	...		...	...	...	...	...	...	
64	2254	2	...	...	1	1	...	...	...	...	...	...	...	...	N	...	...	5	2	...	2	1	...		6	1	...	5	...	...		N	? N	? N	2	...	...	2	...	...		25	3	12	8	2^{22}	...	
65	2269	14	3	...	9	1	...	...	...	1	...	...	...	...	N	?23	...	3	2	...	1	...	...		9	...	4	5	...	...		N	...	...	9	3	1	5	...	...		27	...	20	6	1^{24}	...	
66	2583	1	...	...	...	1	...	...	...	...	...	...	...	...	N	...	d-en	2	...	2	...	...	...		10	3	6	...	1	...		N	...	d-tu	11	6	...	4	1^{25}	...		17	7	10	...	...	...	
67	2627	6	1	...	2	1	...	...	...	...	2^{26}	...	...	...	N	...	d-ap	3	1	...	2	...	...		8	...	6	1	1^{27}	...		N	...	d-P	10	4	3	3^{28}	...	...		33	3	27	3	...	...	
68	2685	5	...	...	3	1	...	...	...	...	1	...	...	...	N^{29}	...	...	2	...	2	...	...	...		...	...	...	...	...	...		N^{30}	...	...	4	...	2	...	2^{31}	...		...	...	...	...	...	...	
69	2983	7	...	...	6	1	...	...	...	...	...	...	...	...	N	...	...	5	...	3	1	1	...		16	...	15	...	...	1^{32}		N	N	...	4	...	1	3	...	. .		22	...	15	6	...	1^{33}	
70	3021	10	3	2	4	1	...	...	...	...	...	...	...	...	N^{34}	...	...	...	...	...	...	...	...		...	...	...	...	...	...		N	...	...	3	...	3	...	...	...		...	...	...	...	...	...	
71	3189b	3	...	...	2	...	1	...	...	...	...	...	...	...	N	A	F A	7	5	...	...	...	2^{35}		...	...	...	...	...	...		N	...	...	...	...	...	...	...	...		...	...	...	...	...	...	
72	3296	2	...	...	1	1	...	...	...	...	...	...	...	...	N^{36}	...	...	7	1	2	2	2^{37}	...		24	...	22	2	...	...		N	N	N	8	5	...	3	...	...		64	2	42	9	7^{38}	4^{39}	
73	4096b	4	1	...	2	1	...	...	...	...	...	...	...	...	N	...	...	...	...	...	...	...	...		...	...	...	...	...	...		N	N	M	11	...	...	10	...	1^{40}		...	...	...	...	...	...	
74	4113	3	...	...	2	1	...	...	...	...	...	...	...	...	N^{41}	...	...	10	1	8	1	...	...		27	...	21^{42}	5	1^{43}	...		N^{44}	N^{44}	M	12	3	6	2	1^{45}	...		29	4	22^{45}	2	1	...	
75	4413	7	1	...	5	1	...	...	...	...	...	...	...	...	N	...	...	11	8	2	...	...	1		1	...	...	...	...	1^{47}		N	A	...	3	1	2	...	...	...		53	...	52	...	...	1^{48}	
76	4489	5	...	...	4	1	...	...	...	...	...	...	...	...	N	...	...	6	...	1	4	...	1^{49}		26	...	19	6	1^{50}	...		N	...	...	7	...	4^{51}	1	...	2^{52}		5	1	3	...	...	1^{52}	

NOTES.—[1] ch, [2] E, [3] Sx, [4] A, [5] E, [6] A, [7] I, [8] d-ca, [9] d kd, [10] 1 d-P 1 sco, [11] clubfoot, [12] E, [13] Sx, [14] E, [15] d-bd, [16] F, [17] F, [18] d-T, [19] ch sm, [20] d-ca, [22] d-P, [23] d-ca. [24] d su, [25] sm, [26] 1 ch 1 hy, [27] A, [28] 1bd 1go, [29] d-T, [30] d-ca, [31] P, [32] F su Sx, [33] E, [34] d-bd, [35] G, [36] d-T, [37] A, [38] 6 P 1 A, [39] 3 E 1 F, [40] E, [41] d-cancer, [42] 1 d-cancer, [43] A, [44] d-T, [45] M, [46] 4 d-T, [47] E, [48] I, [49] E, [50] A, [51] 3 d-T, [52] F, [53] 1 F 1 I, [54] M, [55] ch, [56] 5-T, [57] 8 T and 2 D, [58] 1 E 1 F, [59] 4 T 1 B, [60] 4 T, [61] 1 P 3 ecc 1 sh, [62] 2 E 8 F 2 I, [63] 1 P and 1 A, [64] 1 E 1 I, [65] 1 C 4 A, [66] 6-T, [67] 1 A 1 M.

* Includes miscarriages and stillbirths.

TABLE VIII.

Migrainous Matings.

The children are classified by nervous and mental condition, by vitality, and by the condition of the parents.

	M × E.		M × F.		M × M.		M × A.		M × Ne.		M × N.		Total.	
Number of matings.	2		3[5]		4[6]		14[7]		9[8]		18[9]		50	
Number of conceptions.	14		26		22		95		62		131		350	
Offspring—	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Epileptic	3	21	4	15	6	27	14	14	9	14	19	14	55	15
Feeble-minded ...	0	...	1	4	0	...	6	6	1	1	4	3	12	3
Tainted	2	14	4[1]	15	12[2]	54	15[3]	16	20	32	10[4]	7	63	18
Normal	2	14	2	8	0	...	15	16	16	25	47	36	82	23
Total	7	50	11	42	18	81	50	52	46	72	80	60	212	59
Died in infancy	2	14	8	30	0	...	25	26	4	6	20	15	59	17
Died young ...	2	14	4	15	4	18	3	3	7	11	11	8	31	9
Unclassified ...	1	7	2	8	0	...	16	17	4	6	14	10	37	10
Stillbirths ...	0	...	0	...	0	...	0	...	0	...	1	1	1	...
Miscarriages ...	2	14	1	4	0	...	1	1	1	1	5	4	10	3
Total	7	50	15	57	4	18	45	47	16	28	51	40	138	39

[1]2—migrainous. [2]3—migrainous. [3]2—migrainous. [4]3—migrainous.

5 In one case the migrainous parent had an epileptic relative.

6 Of the 8 migrainous parents, 3 had epileptic relatives.

7 2 of the alcoholic and 1 of the migrainous parents had epileptic relatives.

8 1 of the migrainous and 1 of the neurotic parents had epileptic relatives.

9 2 of the normal and 5 of the migrainous parents had epileptic relatives.

TABLE IX.

ALCOHOLIC MATINGS.

The Children are classified by nervous and mental condition, by vitality, and by the condition of the parents.

	A x E[1]		A x F[1]		A x I		A x A[2]		A x M[3]		A x Ne[4]		A x N[5]		Total.	
Number of matings.	17		18		6		7		14		30		39		131	
Number of conceptions.	108		118		29		48		95		200		247		845	
Offspring.	No.		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Epileptic	19	18	21	17	7	24	8	17	14	14	39	20	43	17	151	18
Feeble-minded ...	9	8	29	24	3	10	2	1	6	6	7	4	4	2	60	6
Neurotic	15	13	13	11	2	7	9	12	15	16	27	14	25	10	106	12
Normal	13	12	7	6	2	7	5	19	15	16	52	26	83	33	177	21
Total	56	51	70	58	14	48	24	50	50	52	125	63	155	62	494	57
Died in infancy ...	10	9	17	14	1	3	8	17	25	26	27	14	25	10	113	13
Died young	16	15	15	12	5	17	4	8	3	3	24	12	38	15	105	12
Unclassified	9	8	13	11	6	20	5	10	16	17	17	9	20	9	86	10
Stillbirths...	1	1	2	2	...	...	...	...	...	...	2	1	2	1	7	1
Miscarriages	16	15	1	1	3	11	7	14	1	1	5	3	7	2	40	5
Total	52	48	48	40	15	51	24	50	45	47	75	38	92	37	351	41

[1] 1 of the alcoholic parents has 1 or more epileptic relatives.

[2] 3 ,, ,, ,, have epileptic relatives.

[3] 2 ,, ,, and 1 of the migrainous parents have epileptic relatives.

[4] 6 ,, ,, ,, 4 of the neurotic parents have epileptic relatives.

[5] 5 ,, ,, ,, 4 of the normal parents have epileptic relatives.

TABLE X.

In the following Table the Patients are arranged by rank in the line of conception and by the size of the fraternity.

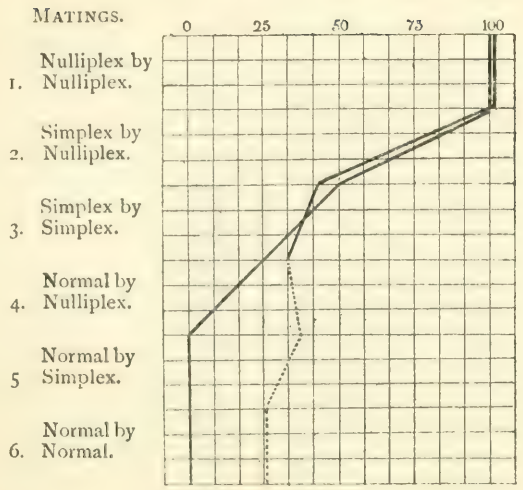
Size of Fraternity.

Birth Rank	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	Unk.	Total.
1st	19	10	12	14	6	5	5	6	5	3	2	...	1	1	...	...	1	...	...	...	90
2nd	...	12	16	15	8	9	7	6	4	4	...	...	...	...	...	...	...	...	...	...	81
3rd	...	...	12	9	14	8	5	7	2	3	2	3	...	...	...	...	...	...	...	...	65
4th	...	...	...	9	6	5	7	6	3	2	1	...	...	...	...	...	...	...	...	...	39
5th	...	...	...	...	12	6	10	4	3	2	2	1	...	...	...	...	...	...	...	...	40
6th	...	...	...	...	...	9	3	5	2	3	...	...	...	1	...	...	...	...	...	...	23
7th	...	...	...	...	...	...	5	2	1	4	1	...	1	1	...	...	...	...	...	...	15
8th	...	...	...	...	...	...	...	5	3	1	...	2	1	...	...	...	...	...	1	...	13
9th	...	...	...	...	...	...	...	...	3	1	1	1	...	...	...	1	...	...	...	...	7
10th	...	...	...	...	...	...	...	...	...	3	1	2	...	...	...	1	...	...	...	...	7
11th	...	...	...	...	...	...	...	...	...	...	3	...	...	1	1	...	...	...	...	...	5
12th	...	...	...	...	...	...	...	...	...	...	...	3	...	...	...	...	...	...	...	...	3
13th	...	...	...	...	...	...	...	...	...	...	...	...	3	...	...	...	...	...	...	...	3
Unknown	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	6	6
Total	19	22	40	47	46	42	42	41	26	26	13	12	6	4	1	2	1	...	1	6	397

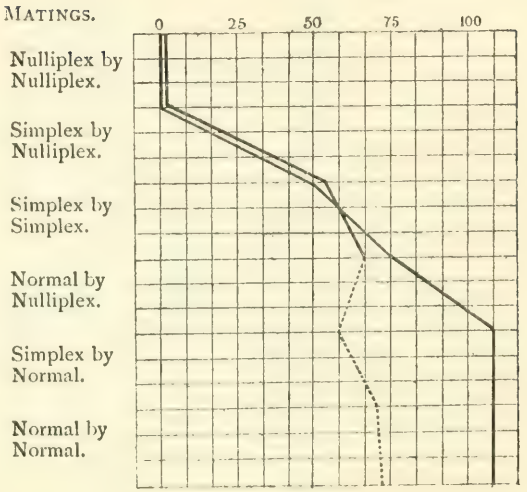
236, or nearly 60% (59·6), come before the 4th in the line of birth.

TABLE XI.

NULLIPLEX OFFSPRING.
R.R.



SIMPLEX AND NORMAL OFFSPRING.



The figures for Table I. were used or the first mating ; or the second those of Table III. ; for the third the figures of Table V. ; for the fourth those of Table IV. ; for the fifth those of Table VI. ; and for the sixth the figures of Table VII. were used.

The dotted line is used for the last three matings because the findings and the histories showed that the normal parents were not duplex except possibly in a few instances, but were simplex and therefore would not properly come under these types.

The fitting is very close for the first three matings, but there is necessarily a poor fitting for the last three.

TABLE A.

	Serial No.	Parents	Classified Relatives.	Classifying the defective and tainted relatives of a normal parent of defective children in Table IV.									
				N.	E.	F.	I.	Ne.	A.	P.	Sx.	ch.	M.
1	1872c	F	...	...	...	...	...	...	...	...	...	...	...
2	2337	F	10	10	...	...	...	...	...	...	...	...	...
3	5386	F	2	1	1	...	...	...	...	...	...	...	...
4	5367	F	3	...	...	...	...	2	1	...	...	...	...
5	5114	M	2	1	...	...	...	...	1	...	...	...	...
6	4127	F	2	...	...	1	...	...	1	...	...	...	...
7	3904	M	15	12	...	...	...	1	2	...	...	...	...
8	3431	M	1	...	...	...	...	...	1	...	...	...	...
9	3426	F	2	...	...	...	...	1	...	...	...	...	1
10	2347	M	2	1	...	...	1	...	...	...	...	...	...
11	1714	F	8	4	...	1	...	2	1	...	...	...	...
12	XIV	F	5	5	...	...	...	...	...	...	...	...	...
13	4521	F	6	...	...	...	1	4	...	1	...	...	...
14	666	M	9	9	...	...	...	...	...	...	...	...	...
15	2124	M	8	7	...	...	...	1	...	...	...	...	...
16	4392	F	1	...	...	...	...	...	...	1	...	...	...
17	4270	M	1	...	1	...	...	...	...	...	...	...	...
18	4318	F	12	12	...	...	...	...	...	...	...	...	...
19	2207	F	12	10	...	...	1	1	...	...	...	...	...
20	2819	M	25	18	2	...	...	5	...	...	...	...	...
21	4357	F	3	2	...	...	...	...	...	1	...	...	...
22	380	M	14	4	...	1	...		...	1	...	...	...
23	898	M	13	5	1	2	1	2	1	...	...	1	...
24	1342	M	16	7	3	...	3	3	...	...	...	...	...

TABLE B.

	Serial No.	Parents	Classified Relatives.	Classifying the defective and tainted relatives of a normal parent of defectives in Table VI.												
				N.	E.	F.	I.	Ne.	A.	P.	Sx.	ch.	M.	d-ap.	su.	C.
1	1745a	M	64	8	5	32	1	4	12	...	...	...	1	...	...	...
2	3332	F	2	...	1	...	...	...	...	...	...	...	1	...	...	...
3	4576	F	6	...	1	...	...	2	2	...	...	..	...	...	1	...
4	4437	M	5	4	...	...	...	...	1	...	...	...	...	...	...	...
5	3734	F	2	...	1	...	...	1	...	...	...	...	...	...	...	...
6	2865	F	8	8	...	...	...	...	...	...	...	...	...	...	...	...
7	2754	F	17	17	...	...	...	...	...	...	...	...	...	...	...	...
8	3234	F	5	2	...	...	1	1	...	...	...	...	1	...	...	...
9	1839	M	9	2	...	...	...	6	1	...	...	...	...	...	...	...
10	1506	M	4	4	...	...	...	...	...	...	...	...	...	...	...	...
11	2234	F	14	2	4	1	2	4	1	...	...	...	...	...	...	...
12	1073	M	5	4	1	...	...	...	...	...	...	...	...	...	...	...
13	{1015 / 2096}a	M	5	2	...	...	...	2	1	...	...	...	...	...	..	...
14	5586	M	4	1	1	...	2	...	...	...	...	...	...	...	...	...
15	74	M	8	8	...	...	...	...	...	...	...	...	...	...	...	...
16	224	M	2	1	...	...	...	...	...	...	...	...	...	...	...	1
17	XIII	F	5	...	...	...	...	...	5	...	...	...	...	...	...	...
18	XIII	F	18	16	...	...	...	2	...	...	...	...	...	...	...	...
19	35	F	4	...	...	...	2	1	1	...	...	...	...	...	...	...
20	4301	F	1	...	...	...	1	...	...	...	...	...	..	...	...	...
21	4036	M	8	7	...	...	...	...	...	...	...	...	1	...	...	...
22	5095	F	2	...	1	1	...	...	...	...	...	...	...	...	...	...
23	4942	F	3	...	...	...	1	1	1	...	...	...	...	...	...	...
24	4925	M	12	11	...	...	...	...	1	...	...	...	...	...	...	...
25	3542	M	2	1	1	...	...	...	...	...	...	...	...	...	...	...
26	3532	M	26	25	...	...	...	1	...	...	...	...	...	...	...	...
27	3452	M	6	4	...	1	...	1	...	...	...	...	...	...	...	...
28	3521	F	4	2	...	2	...	...	...	...	...	...	...	...	...	...
29	4243	F	3	...	...	2	...	1	...	...	...	...	...	...	...	...
30	4356	F	2	2	...	...	...	...	...	...	...	...	...	...	...	...
31	5354	M	2	...	...	...	...	...	2	...	...	...	...	...	...	...
32	153	F	11	9	...	...	1	...	1	...	...	...	...	...	...	...
33	413	F	4	...	...	...	1	2	...	...	...	...	...	...	1	...
34	4213	F	12	4	...	...	...	...	7	...	...	...	1	...	...	...
35	XXXIV.	M	2	1	...	...	...	1	...	...	...	...	...	...	...	...
36	1254	F	7	6	...	...	...	...	1	...	...	...	...	...	...	...
37	XIV.	M	4	3	...	...	...	...	...	1	...	...	...	...	...	...
38	2134	F	13	9	...	2	2	...	...	...	...	...	...	...	...	...
39	904	F	2	2	...	..	...	...	...	...	...	...	...	...	...	...
40	2913	M	4	3	...	...	...	1	...	...	...	...	...	...	...	...
41	904a	F	3	1	...	1	...	...	1	...	...	...	...	...	...	...
42	198	F	4	4	...	...	...	...	...	...	...	...	...	...	.	...
43	1324	M	15	14	...	1	...	...	...	...	...	...	...	...	...	...
44	1664	M	3	...	...	2	1	...	...	...	...	...	...	...	...	...
45	5186	M	3	...	...	...	2	1	...	...	..	...	...	...	...	...
46	1703	M	10	6	...	2	...	...	2	...	...	...	...	...	...	...
47	94	M	6	4	...	...	...	...	...	2	...	...	...	...	...	...
48	306	F	3	1	...	...	1	...	...	...	...	1	...	...	...	...
49	1149	F	2	...	...	...	1	...	...	...	...	1	...	...	...	...
50	1435	F	14	10	2	...	1	...	...	1	...	...	...	...	...	...
51	194b	M	18	17	...	1	...	...	...	...	...	...	...	...	...	...
52	145	M	7	3	2	1	...	...	...	1	...	...	...	...	...	...
53	335	M	15	11	1	3	...	...	...	...	...	...	...	...	...	...
54	346a	F	9	3	...	...	5	...	...	...	...	...	...	...	1	..
55	1451	F	5	2	...	1	1	..	1	...	...	...	...	...	...	...
56	2375	F	4	...	1	...	...	...	...	3	...	...	...	...	...	...
57	{501 / 3781}b	F	63	45	3	1	2	12	...	...	...	...	...	...	...	...
58	314b	M	9	5	1	1	..	...	...	2	...	...	...	...	...	...
59	1705	M	17	13	2	...	...	2	...	...	...	..	...	..	...	...
60	2557	F	5	4	...	..	...	...	1	..	...	..	...	...	...	...
61	83	F	8	6	...	.	1	...	...	1	...	..	..	...	...	...
62	1475	F	12	10	..	...	.	1	...	1	...	.	..	..	..	..
63	483	M	16	13	...	1		1	..	1	...		..	...	...	..
64	1006	M	12	9	...	...	...	3	...	...	...	..	...	...	...	...
65	1044	M	9	7	...	...	...	1	...	..	...	1	...	...	...	...
66	2193	M	16	11	...	...	1	3	1	..	...	...	...	..	...	...
67	2431	M	10	6	...	2	...	1	1	..	...	...	..		...	...
68	2892	M	14	12	...	...	...	2	...	...	...	...	..		...	...
69	3274	M	2	...	...	...	.	...	1	...	...	...	.		..	1
70	3771	M	13	11	...	...	.	1	1	...	...	...	...	..	..	...
71	4371	M	6	5	..	1	...	...	...	...	...	...	...	...	...	...
72	4475a	M	5	...	1	...	...	4	...	...	...	...	...	..	...	...

TABLE C.

Serial No.	Parents	Classified Relatives.	Classifying the defective and tainted relatives of two normal parents who have defective children in Table VII.												
			N.	E.	F.	I.	Ne.	A.	P.	Sx.	ch.	M.	d-ap.	su.	C.
87	F	20	18	...	1	...	1	...	...	...	...	...	...	...	...
87	M	4	...	1	1	1	...	1	...	...	...	...	...	...	...
27	M	5	3	1	...	...	...	...	1	...	...	...	...	...	...
5621	F	1	1	...	...	...	...	...	...	...	...	...	...	...	...
,,	M	3	2	...	...	...	...	...	1	...	...	...	...	...	...
5332	F	3	2	...	...	...	...	1	...	...	...	...	...	...	...
,,	M	1	...	...	...	1	...	...	...	...	...	...	...	...	...
4052	F	4	4	...	...	...	...	...	...	...	...	...	...	...	...
,,	M	10	9	...	...	...	1	...	...	...	...	...	...	...	...
3965	F	2	2	...	...	...	...	...	...	...	...	...	...	...	...
,,	M	2	2	...	...	...	...	...	...	...	...	...	...	...	...
3862	M	4	...	2	...	...	...	1	1	...	...	...	...	...	...
3742	F	1	...	...	...	...	...	1	...	...	...	...	...	...	...
3604	F	3	3	...	...	...	...	...	...	...	...	...	...	...	...
3604	M	1	...	...	...	1	...	...	...	...	...	...	...	...	...
3252	F	9	6	...	...	...	...	3	...	...	...	...	...	...	...
,,	M	23	22	...	...	...	...	1	...	...	...	...	...	...	...
2996	M	3	...	1	...	1	...	1	...	...	...	...	...	...	...
2713	F	4	2	...	1	...	1	...	...	...	...	...	...	...	...
2713	M	4	2	...	...	...	...	2	...	...	...	...	...	...	...
2394	F	4	4	...	...	...	...	...	...	...	...	...	...	...	...
,,	M	7	2	...	2	1	2	...	...	...	...	...	...	...	...
2056	F	2	1	...	1	...	...	...	...	...	...	...	...	...	...
,,	M	4	3	...	...	...	...	1	...	...	...	...	...	...	...
1924	F	7	1	...	...	2	...	4	...	...	...	...	...	...	...
,,	M	1	1	...	...	...	...	...	...	...	...	...	...	...	...
1885	F	4	...	3	...	...	1	...	...	...	...	...	...	...	...
,,	M	2	2	...	...	...	...	...	...	...	...	...	...	...	...
1423	F	6	2	2	1	...	...	1	...	...	...	...	...	...	...
,,	M	2	...	...	...	...	...	2	...	...	...	...	...	...	...
1334a	F	23	...	3	8	2	6	...	1	...	1	2	...	...	...
1334a	M	5	...	...	2	...	1	1	1	...	...	...	...	...	...
5483	F	12	12	...	...	...	...	...	...	...	...	...	...	...	...
,,	M	16	16	...	...	...	...	...	...	...	...	...	...	...	...
5604	F	2	1	...	1	...	...	...	...	...	...	...	...	...	...
,,	M	2	1	...	...	1	...	...	...	...	...	...	...	...	...
5452	M	3	1	...	...	...	2	...	...	...	...	...	...	...	...
1716	M	10	5	1	...	...	...	2	...	...	...	2	...	...	...
145a	F	4	...	1	...	...	...	...	3	...	...	...	...	...	...
1524a	M	7	...	...	...	...	...	6	1	...	...	...	...	...	...
975	M	12	...	2	...	1	3	5	...	...	...	...	...	...	1
835	M	6	2	2	1	...	...	1	...	...	...	...	...	...	...
1574a	F	7	...	1	1	...	2	2	...	...	...	1	...	...	...
194a	F	4	...	...	2	...	...	...	1	...	1	...	...	...	...
194a	M	18	17	...	1	...	...	...	...	...	...	...	...	...	...
643b	M	11	8	1	...	...	...	1	...	1	...	...	...	...	...
914	M	2	...	...	1	...	...	1	...	...	...	...	...	...	...
936	F	3	2	...	1	...	...	...	...	...	...	...	...	...	...
936	M	3	2	...	...	1	...	...	...	...	...	...	...	...	...
1115	M	3	2	1	...	...	...	...	...	...	...	...	...	...	...
1324	M	21	19	2	...	...	...	...	...	...	...	...	...	...	...
1356	F	16	16	...	...	...	...	...	...	...	...	...	...	...	...
1356	M	1	...	...	1	...	...	...	...	...	...	...	...	...	...
1445	F	1	...	...	1	...	...	...	...	...	...	...	...	...	...
2254	F	8	7	...	...	...	1	...	...	...	...	...	...	...	...
2254	M	14	12	...	...	...	1	...	1	...	...	...	...	...	...
2269	M	12	11	...	...	...	...	...	...	...	...	...	...	1	...
2583	F	2	...	...	...	...	2	...	...	...	...	...	...	...	...
2583	M	5	4	...	...	...	1	...	...	...	...	...	...	...	...
2627	F	1	...	...	...	...	...	1	...	...	...	...	...	...	...
2627	M	7	6	...	...	...	...	...	1	...	...	...	...	...	...
2685	M	2	...	...	...	...	...	2	...	...	...	...	...	...	...
2984	F	3	1	...	1	...	1	...	...	...	...	...	...	...	...
2984	M	10	9	1	...	...	...	...	...	...	...	...	...	...	...
3189	F	4	...	2	1	...	...	1	...	...	...	...	...	...	...
3296	F	6	4	...	...	...	2	...	...	...	...	...	...	...	...
3296	M	14	3	3	1	...	1	...	6	...	...	...	...	...	...
4096b	M	13	11	1	...	...	...	...	...	...	...	1	...	...	...
4113	F	7	6	...	...	...	1	...	...	...	...	...	...	...	...
4113	M	8	5	...	...	...	2	...	...	...	...	1	...	...	...
4413	F	1	...	1	...	...	...	...	...	...	...	...	...	...	...
4413	M	2	...	...	...	...	...	1	...	...	...	1	...	...	...
4489	F	12	10	1	...	...	1	...	...	...	...	...	...	...	...
4489	M	4	1	...	3	...	...	...	...	...	...	...	...	...	...

INFLUENCE DE L'AGE DES PARENTS SUR LES CARACTERES PSYCHO-PHYSIQUES DES ENFANTS.

PROF. ANTONIO MARRO.

Nous sentons tous que vibre dans la nature une loi qui gouverne l'hérédité à travers les générations des êtres vivants, mais ses confins et les influences auxquels cette loi obéit sont parfois si obscurs pour nous qu'ils effleurent presque le mystère.

La question de la transmissibilité du caractère par hérédité date de longtemps. Pour les caractères physiques, personne presque ne la nie, tant les preuves en sont données par les races et par les familles les cas qui font exception semblent très rares.

Celle qui concerne les caractères moraux et intellectuels est plus discutée. Nous pouvons retenir que les Grecs anciens y croyaient; à preuve le soin jaloux que Licurgue mettait dans ses lois, pour assurer la reproduction d'hommes plus sélectés, au point de vue de la vertu et de la valeur, auxquels il voulait que toute femme pût se donner.

Platon voulait aussi bannir de sa République les fils et les neveux des malfaiteurs, et Aristote, à l'appui de son opinion, cite dans son Etique l'exemple d'un misérable qui pour s'excuser des mauvais traitements qu'il faisait subir à son père, s'exclamait: "Mon père frappait mon aïeul, ce dernier avait lui aussi maltraité mon bisaïeul, et remarquez bien, mon fils, ce gamin: aussitôt qu'il aura atteint l'âge et la force d'un adulte, il ne m'épargnera ni coups ni sévices."

Les institutions de la monarchie et de la noblesse héréditaire ont peut-être été fondées sur ce principe.

Les Arabes tiennent compte avec un soin jaloux de la généalogie de leurs juments les plus renommées, non seulement depuis des centaines, mais depuis des milliers d'années.

La souche d'où est né Vésale était depuis son trisaïeul jusqu' à son père, composée de médecins distingués. Le frère du fondateur de l'anatomie humaine a été lui-même entraîné vers les sciences naturelles par une inclination si puissante, que ses parents ne purent lui faire étudier le droit.

Il existe pourtant un fait qui ne peut avoir échappé à l'observation de ceux qui ont étudié le problème de la transmissibilité des caractères au moyen de la génération; tandis que l'on a vu et que l'on voit encore aujourd'hui des enfants hériter de leurs parents des qualités par lesquelles ces derniers étaient devenus éminents, d'autres, au contraire, ne correspondent pas du tout à cette expectative.

A côté du souvenir de Cimon, fils de Miltiade, d'Alexandre, fils de Philippe, de la génération des Scipion et des Gracques, des Decandolle, des Darwin, des Saint-Hilaire, des Herschell, et des Jussieu, on est douloureusement surpris de voir les fils d'Hippocrate voués aux lazzi des

comiques pour leur stupidité* et l'on est frappé de stupeur en constatant que, de la génération de Socrate et d'Aristote, il n'est pas sorti la moindre étincelle de science; que Charles V., Pierre le Grand, Napoléon I^{o} n'eurent que des fils ineptes, et tant d'autres dont parle l'histoire, ou que tous les jours on observe dans la société.

Aucun étonnement donc pour ce que Dante chantait jadis :—

> " Rade volte risurge per li rami
> L' umana probitade, e questo vuole
> Quei che la dà, perchè da lui si chiami."

Même dans ces derniers temps, alors que Galton écrivait un volume pour prouver que le génie tirait ses origines des familles dans lesquelles il s' était pour ainsi dire préparé et mûri, Buckle niait cette transmission contredite par mille faits.†

Il existe des faits irréfutables à l' appui de l' une et de l' autre opinion. L'influence de l'hérédité est trop évidente pour être niée, vu qu'on en observe les résultats, spécialement dans les races et les peuples, comme par exemple celles des Gaulois et des Germains, qui conservent de nos jours encore les qualités morales signalées par César et Tacite il y a des siècles. D' autre part, il est des faits indéniables qui, en apparence tout au moins, la contredisent, et cela nous conduit naturellement à reconnaître que, tandis que la loi de l'hérédité existe réellement, il doit pareillement exister quelques agents modificateurs qui en dévient l'influence.

Une des causes perturbatrices, en apparence tout au moins, de l'hérédité, réside dans l'union pas toujours homogène des caractères des parents. Père et mère apportent dans la génération une quantité d'aptitudes, les unes visibles, les autres latentes, qu'eux mêmes ont déjà reçues en héritage de leurs auteurs. Si l'union est telle que les bons germes puissent s'additionner, alors les belles qualités du père et de la mère se porteront à un degré de développement presque surprenant; si, au contraire, les qualités de la mère sont en contraste avec celles du père et vice-versa, de deux parents distingués peuvent naître des enfants médiocres.

Les effets de cette cause perturbatrice de l'hérédité difficiles à calculer sont insuffisants à en expliquer toutes les anomalies vraies ou apparentes. Inexplicables seraient, par sa seule invocation, les cas où il survient une différence, allant parfois jusqu' à la disparité des caractères des différents enfants nés de mêmes parents. On doit par suite admettre d'autres influences.

Entre deux actes génératifs peuvent avoir lieu et adviennent réellement des modifications dans l'organisme des parents, lesquelles doivent se réfléchir sur les enfants qui naissent.

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* Galeno, Quod animi vires corporis temperaturas sequuntur, p. 318. Venise, 1709.

† T. H. Buckle, Storia dell' incivilimento in Inghilterra traduzione italiana, t. I, cap. IV., p. 187. Milano, 1864.

Nous avons une preuve directe de la loi dans les anomalies des fils de parents qui se trouvaient, eux-mêmes, dans des conditions anomales à l'époque de la génération.

Dans l'ordre physique, Darwin en cite un cas, qui est très lumineux :

Un taureau, en sortant de l'étable, eut la queue coupée par la porte qui se ferma subitement. Tous les veaux engendrés par ce taureau nacquirent sans queue.

L'expérience de Brown-Séquard, que j'ai répétée moi-même différentes fois, de rendre les cobayes épileptiques par la résection du nerf sciatique, est classique. Les petits qui en naissent sont eux mêmes épileptiques.

Un état accidentel, et même parfois seulement temporaire des parents, l'ivresse, exerce une influence puissante sur la génération.

La science a désormais mis hors de conteste que non seulement l'alcoolisme habituel de l'un ou des deux producteurs, mais encore le simple état d'ivresse au moment de l'acte de la génération suffit pour transmettre des caractères dégénératifs aux enfants.

L'influence héréditaire de l'alcoolisme n'avait pas échappée aux anciens. La tradition mythologique rapportait la difformité de Vulcain dûe à l'état d'ébriété du père Jupiter au moment où il l'engendrait, et suivant Platon,* les Carthaginois avaient défendu par une loi l'usage des boissons alcooliques aux conjoints lorsqu'ils voulaient procréer des enfants, pour obvier à leurs funestes effets transmis par l'hérédité.

Morel attribue à l'influence dégénérative de l'alcoolisme l'abolition complète du sens moral, la diminution de la sensibilité physique et de la déperdition des forces.

Chez les délinquants, mes statistiques m'ont donné le 46% de fils d'alcooliques, tandis que parmi les normaux, les descendants d'alcooliques n'arrivent qu'à la proportion de 16%.†

Durant mes longues années d'exercice comme médecin cantonal, tous les enfants que j'ai vu frappés de convulsions avaient un père ou une mère alcoolique, quand ce n'était pas les deux.

J'ai voulu en outre chercher si d'autres formes de modifications acquises dans le caractère des parents étaient transmises aux enfants.

Dans le cours naturel de la vie, depuis l'enfance jusqu'à la jeunesse, à la maturité, à la vieillesse, l'organisme humain parcourt nécessairement différentes phases de développement, se trouvant tout d'abord en voie de formation, arrivant progressivement au développement complet, pour parcourir ensuite une période de décadence, pendant laquelle il va en déclinant, s'usant et devient de moins en moins apte à un service ultérieur. Or, l'activité génésique de l'homme, quoiqu'elle fasse défaut au premier et au dernier âge, embrasse nonobstant une période assez étendue qui commence à une époque d'immaturité ou tout ou moins de maturité incomplète et s'avance

* Platon, Des lois. Livre V., p. 128, traduction de V. Conti-Paris, 1831.

† A. Marro, Caratteri dei delinquenti, p. 237.

notablement dans la période de la décadence. Il est donc naturel que les enfants nés des mêmes parents, aux diverses phases de leur organisme, héritent de dispositions particulières à chacune d'elles.

C'était un fait déjà connu d'Aristote lui-même, que l'extrême jeunesse des parents, de la mère surtout, lègue aux enfants un héritage d'imparfait développement et de faiblesse, d'une taille peu élevée et d'une constitution médiocre.

Lucas écrit que De la Fontaine, chirurgien-chef dans le dernier royaume de Pologne, attribuait l'extrême faiblesse physique des Juifs aux unions prématurées. Le même fait a pu se vérifier en France. Au commencement du siècle dernier, en 1812-13, la loi inexorable de la conscription poussa les familles décimées à marier leurs enfants avant l'âge, et jamais on eut autant de cas de réforme par faiblesse de constitution qu'en 1833-34.

Burdach trouva dans la même raison l'explication de l'infériorité que les premiers nés présentent souvent pour l'intelligence et les aptitudes, respectivement à leurs frères.*

D'autre part, pendant la vieillesse, l'homme s'en va graduellement en perdant, en même temps que l'énergie physique, une partie de son énergie morale, et la génération issue de gens âgés ne peut que porter la funeste influence de la décadence qui a déjà envahi l'organisme des parents. Les Romains avaient établi, par une loi, que le mariage était prohibé à l'homme après 60 ans.

Buffon, dans son Histoire Naturelle, à propos du cheval, écrit que les juments nées de vieux étalons et de vieilles juments montrent des signes précoces de vieillesse.

Dès mon adolescence, d'après ce que j'avais observé chez deux de mes camarades, j'ai soupçonné que les enfants de parents âgés portaient dès leur naisance des caractères physiques et psychiques anormaux; et, à cet égard, je disais déjà il y a quelques années :† "La tendance qui, parmi les classes instruites spécialement, porte les hommes à contracter mariage à un âge plutôt mûr, doit avoir une influence notable sur les caractères des nouvelles générations. L'activité nutritive, la vigueur du coeur et des muscles, l'énergie de l'âme et la force de l'esprit tendront par ce fait à s'affaiblir de plus en plus, pour donner lieu, d'une part, à de la langeur nutritive, aves tendances aux congestions du foie, à la lithiase et à la diathèse goutteuse, à l'impuissance, etc. ; et, d'autre part, à la circonspection de l'âme, à la manie ambitieuse et au froid égoïsme, qui, comme on le sait, vont grandissant de la jeunesse à la vieillesse."

Il avait résulté de mon observation pendant mon service de médecin cantonal, que tous les enfants atteints de lithiase dont je connaissais les familles, étaient nés de parents âgés.

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* Prosper Lucas, Traité philosophique et physiologique de l'hérédité naturelle, p. 439. Paris, 1850.

† A. Marro ; Guida all 'arte della vita. p. 168. Torino, 1880.

Il manquait cependant une véritable étude qui spécifiât les rapports entre l'âge des parents et les qualités héréditaires de la progéniture.

En 1883, Ball et Regis* publièrent une étude comparative sur les différents âges auxquels arrivaient les membres des deux sexes des familles des névropathes (épileptiques et histériques), d'alcooliques, d'aliénés, de paralytiques et de vésaniques comparés aux individus normaux, pendant quatre générations, c'est-à-dire les aïeux, les parents, les individus soumis à un examen avec leurs frères et soeurs, et enfin les enfants et les neveux. De cette étude, ils conclurent que la durée de la vie est plus longue chez les ascendants des aliénés, que chez ceux des gens normaux, et la longévité est plus grande chez les ascendants des paralytiques généraux et des alcooliques, chez lesquels elle arrive à des proportions notables, tandis que chez les névropathes et les vésaniques, elle s'approche de celle des normaux.

Toutefois Ball et Regis n'étaient pas arrivés à tirer de leurs études la conclusion, qui en résulte indirectement, c'est-à-dire que les parents de ces malades ayant atteint un âge très avancé, les avaient procréés fréquemment à un âge déjà mûr; ce qui tendrait à donner la preuve que la vieillesse des parents prédispose les enfants à des lésions cérébro-spinales, et à des tendances alcooliques.

Profitant de l'occasion qui m'était offerte pendant que j'étais médecin de la Maison de Justice de Turin, j'ai essayé de faire un examen comparatif des délinquants et des personnes vivant en liberté, pour découvrir s'il existait entre les uns et les autres des différences en rapport avec l'âge des parents à l'époque à laquelle ils avaient engendré.

J'ai examiné à cet effet 456 délinquants et 1,765 normaux divisés en 771 nouveau-nés, 917 écoliers et 77 adultes; j'y ajoutai en outre 100 aliénés du Manicome de Turin, pris au hasard parmi les nouveaux entrés de 1886, chez lesquels j'ai complèté cette étude.

Je commençai à classer l'âge des parents en trois périodes, c'est-à-dire: d'immaturité, de complet développement et de décadence. Pour marquer la période d'immaturité, je pris comme limite l'âge fixé par notre législation, après lequel l'homme peut se marier sans le consentment de ses parents (25 ans). Je limitai la période de développement parfait entre 26 et 40 ans. Je marquai la période de décadence à partir de 41 ans, parce que les oculistes admettent que la presbytie commence à cet âge, et qu' à cet âge l'homme a généralement une tendance à l'adipose, premier indice du ralentissement de son mouvement vital, et comme conséquence naturelle, une décadence de ses pouvoirs biologiques.

Ayant ainsi divisé les parents de mes sujets observés suivant les divers âges, mes recherches m'ont démontré que le nombre de délinquants était prépondérant parmi les descendants de parents très jeunes ou vieux comparativement à ce qui s'observait parmi les gens vivant en liberté.

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* Les familles des aliénés au point de vue biologique (Encéphale 1883).

Ce résultat obtenu, j'ai voulu rechercher s'il se trouvait un lien entre les formes spéciales de délits, dans lesquelles se révèlent les caractères des condamnés, et les particularités de caractère inhérentes aux différents âges auxquels les parents les avaient procréés.

Les conditions psychiques qui prédisposent à la criminalité, consistent parfois en une plus grande impressionnabilité de caractère, par suite l'âme réagit avec une plus grande promptitude aux mobiles qui viennent l'exciter, et résiste moins longtemps aux séductions de différentes natures qui caressent ses passions. Parfois, au contraire, la criminalité prend origine dans de véritables impulsions morbides, qui naissent d'un état de dépression de l'âme, d'un manque d'affectivité ou d'un délire de persécution.

Or, nous pouvons retenir que les premières conditions prédisposant au délit se trouvent liées à l'état naturel propre à la jeunesse. Chez elle, on note la plupart du temps une exaltation du ton sentimental qui, naturellement, se trouve unie à l'irréflexion, à l'imprévoyance, entraîne facilement aux plaisirs, à l'aversion d'occupations soutenues et uniformes, que réclament la plupart des travaux professionnels, parce que les forces ne sont pas encore bien proportionnées, et qu'aux représentations mentales inhibitoires, il manque encore la force de résister aux impressions qui arrivent au sensorium commun.

Par contre, les qualités qui marquent la dépression, la mélancolie, le défaut d'affectivité et la tendance au délire des persécutions, peuvent à priori être considérées comme hérédité de parents trop âgés, parce que dans la vieillesse, la déchéance des forces physiques se réfléchit sur le moral ; l'homme tend à devenir mécontent de tout le monde, la prudence, la circonspection et l'égoïsme deviennent chez lui plus grands. En somme, dans son âme prédomine un état de dépression qui lui ôte la confiance dans ses propres forces ; par suite, le calcul, le soupcon, l'avarice tendent à prendre le dessus, si la bonne éducation reçue dans la jeunesse, la réflexion mûrie, et la pratique de la vertu des années précedents ne viennent constituer un frein solide contre les manifestations des nouvelles tendances, que le progrès des années tend a développé.

Ces altérations psychiques propres de la vieillesse, suivant les recherches faites par Kostjurin dans le laboratoire d'Obersteiner à Vienne, auraient un fond anatomique consistant en dégénérescence graisseuse pigmentaire des cellules nerveuses de la substance corticale des hémisphères cérébraux, avec porose, atrophie des tubes nerveux, athérome vasculaire, condensation du tissu connectif, et apparition de corpuscoles amyloïdes à la périphérie du cerveau.

Or le résultat de mes recherches, pour ce qui regarde le caractère des délinquants par rapport à l'âge des parents au moment de leur naissance, correspond aux prévisions théoriques (Voir tableau.)

TABLEAU I.

Proportionnalité des pères des normaux, délinquants, et aliénés dans les divers périodes d'âge selon l'époque de la naissance.

	Période		
	d'immaturité	de plein développement	de déchéance
Normaux	8·8%	66·1%	24·9%
Délinquants en total	10·9%	56·7%	32·2%
Assassins	2·9%	33·1%	52·9%
Coups et blessures	13·5%	45·9%	40·5%
Viol	2·7%	66·6%	30·5%
Voleurs	15·5%	57·2%	27·1%
Escrocs	2·8%	60·0%	37·1%
Aliénés	17·0%	47·0%	36·0%

Parmis les attentats contre la propriété nous trouvons un grand nombre de fils de parents jeunes ; et c'etait naturel. Le premier mobile de vol n'est pas une impulsion due à la mechanceté qui pousse à porter préjudice à autrui ; mais l'amour des plaisirs, des orgies, de l'oisiveté qui sont propres au jeune âge, dans lequel règnent les passions et auquel manque le frein pour les comprimer et les dominer.

J'ai pourtant trouvé une exception. Dans une classe de criminels contre la propriété, les escrocs, les fils de parents âges, se rencontrèrient dans une proportion assez notable, tandis que les fils de parents jeunes étaient peu nombreux.

Il ne pouvait pas en être autrement. L'escroquerie suppose ordinairement une longue préméditation, et, de plus, beaucoup de malice unie à un état particulier de l'âme par lequel celui qui la commet se montre plutôt incliné à mettre en jeu des facultés psychiques, simulation et hypocrisie, au lieu de ses forces physiques, agilité, dextérité et violence. Les premiers sont précisément les caractères propres surtout à la vieillesse, tandis que ces derniers sont particulièrement ceux de la jeunesse.

Nous avons en vérité deux périodes dans la vie de l'homme, dans lesquelles il est disposé à recourir à l'astuce plutôt qu'à la force. La première correspond à l'enfance, lorsque la force physique fait encore défaut, la deuxième à l'âge avancé, lorsque la force physique commence à déchoir. A la première de ces deux époques, l'homme n'est pas encore apte à la génération ; avec cette aptitude arrive, à l'âge de la jeunesse, l'impulsion à la violence.

Chez les escrocs la proportion de fils de parents âges monte à 37% et si elle n'est pas supérieure, la raison en est que nombre d'entre eux ont commis ce délit à un âge déjà avancé, lorsqu'ils avaient déjà eux-mêmes acquis avec l'expérience de la vie les qualités spéciales qui les prédisposaient à un tel genre de crime.

Chez les véritables escrocs la proportion monte à 56% si on y comprend avec ceux qui descendaient de parents avancés en âge, les délinquants âgés eux-mêmes.

De telle sorte, le mot de Quetelet, que l'escroquerie est le crime de l'âge mûr, ressort, d'après mes recherches, profondément vrai, si on fait remonter l'influence de l'âge à la génération.

Il m'est arrivé d'observer, il n'y a pas longtemps, un nouveau cas qui sert admirablement à prouver la tendance à l'escroquerie héréditaire de parents âgés. Il s'agissait d'un individu de 25 ans accusé de différentes escroqueries. Il était fils de parents âgés tous deux; le père ayant plus de 50 ans à sa naissance et la mère 42. Cette dernière était en outre névropathe. Le fils grandit avec des manifestations évidentes de folie morale, intelligence obtuse, aversion du travail, tendance au vol. A l'âge de 11 ans, il dévalisa la maison de sa mère, puis se fit lier et baîllonner sur une chaise par un complice pour donner à entendre à sa mère que des voleurs étrangers étaient entrés dans la maison, et l'avaient mis dans l'impossibilité de donner l'alarme, tandis qu'ils emportaient les valeurs qui manquaient. La justice mit à nu la supercherie, et l'enfant fut condamné à la prison. Plus tard, à l'insuffisance morale venaient s'ajouter des manifestations morbides d'une autre nature; mais l'impulsion au délit se révélait de nouveau par des escroqueries de différentes natures, qui le rappelaient une seconde fois sur le banc des accusés.

Dans les crimes contre les personnes, ainsi qu'il fallait s'y attendre, j'ai trouvé une supériorité dans la nombre des fils de parents âgés. Les assassins, les homicides, ceux qui démontrent l'absence la plus complète de sentiments affectifs, et fréquemment un délire plus ou moins net de persécution, donnèrent l'énorme proportion de 52.9% d'enfants de pères avancés en âge, proportion de beaucoup supérieure à celle donnée par toutes les autres catégories de délinquants; et la proportion se maintient grande tant pour les pères que pour les mères âgées qui figurent dans leur ascendance pour le 38% contre de 17% présenté par les hommes normaux.

Les plus féroces assassins que j'aie eu l'occasion d'étudier, avaient un père, une mère, ou tous les deux âgés. Un d'entre eux, fils de parents âgés, tous les deux, ayant vu sa soeur se moquer de ce qu'il était estropié, après avoir tenté sur elle de se livrer à des turpitudes, s'empara d'une massue et lui écrasa la tête; il se vantait avec moi de l'effet de son coup.

De même était fils de parents âgés un autre assassin qui, avec un complice, attira un passant dans un bois pour le tuer et le voler; de même un troisième, qui tua le père d'une jeune fille qu'il voulait violer.

Les fils de parents jeunes se trouvent en proportion minime parmi les assassins et homicides. Je n'en trouve guère que 3% descendants d'un père jeune.

La proportion des pères âgés est encore assez notable, 40% parmi les condamnés pour coups et blessures; mais nous trouvons en même temps

accru chez eux le nombre des descendants de parents jeunes ; il est supérieur à la proportion des normaux, et atteint 13.5%.

Ce fait est naturel, parce que quand il s'agit de blessures simples ou de rébellions, le manque d'affectivité peut avoir agi autant que le caractère indomptable, supportant mal les offenses par une promptitude naturelle (comme cela se présente fréquemment chez les jeunes), ou par excitation alcoolique ; tandis que chez l'assassin qui médite le coup et pousse la réaction jusqu'à ôter la vie à son adversaire, les sentiments affectifs doivent toujours être profondément altérés.

Une classe de criminels contre les personnes, dans laquelle les descendants de parents âgés ne prédominent pas avec autant d'évidence, est celle des coupables de viol, dont la proportion est de 30% ; nous avons toutefois en compensation un nombre plus grand de mères âgées.

Parmi les aliénés, j'ai trouvé que tous les fils nés de pères trop jeunes ou trop vieux présentent une proportion supérieure au normaux et aux délinquants pris en totalité. Le nombre que j'en observais (100) ne permet pas de déduire des conséquences très fondées sur le rapport des différentes formes d'aliénation mentale avec l'âge des parents ; j'ai trouvé cependant que les formes qui guérissent le plus facilement, les mélancolies simples et les manies, donnent relativement aux normaux un contingent un peu plus élevé de fils de pères jeunes (15%), un peu moins de fils de pères d'âge moyen (59%) ; et un nombre presque égal de fils de pères âgés, 25%. Dans les formes mélancoliques dégénératives, le contingent des fils de pères âgés atteignit le maximum ; deux internés affectés de phrénose hypocondriaque ont été engendrés par des hommes dont l'un avait 56 et l'autre 61 ans, tandis que les mères n'en avaient que 38 et 34.

Dans les autres formes dégénératives, paranoïa, folie morale, hebephrénie, épilepsie, nous avons aussi un nombre supérieur d'enfants de pères âgés, 47%, tandis que nous trouvons 35% d'enfants de pères d'âge moyen, et 17% d'enfants de pères trop jeunes. La folie morale se distingue entre toutes par la forte proportion d'enfants de pères âgés ; 5 sur 7 de mes examinés se trouvaient dans ce cas, dont 3 avaient aussi une mère âgée : un seul, dont le père avait 40 ans, l'autre eut pour père un homme de 21 ans. Dans le nombre total des jeunes aliénés la descendance de pères âgés s'est montrée dans la proportion de 41% et de 20% pour la mère, supérieure donc, comme je l'ai déjà signalé, à la moyenne des aliénés en général : ce qui prouve la plus grande fréquence du vice dégénératif chez les aliénés jeunes.

Parmi les paralytiques généraux, les fils de pères âgés abondent aussi : 44%. Dans cette classe les fils de pères jeunes se trouvaient en proportion minime, 10%. Un paralytique, fils d'un père assez jeune, 27 ans, avait eu dans ses ancêtres des cas d'une singulière longévité ; sa bisaïeule paternelle était arrivée à l'âge de 116 ans, ainsi que me l'a dit la femme du malade, et sa grande mère qui, je crois, vit encore, en a 99 : cela prouve l'exactitude de l'observation de Ball et Regis sur la longévité des ancêtres de cette classe

de malades, et confirme mon idée sur l'influence de l'âge avancé des parents sur l'apparition, chez les fils, de psychopathies déterminées, y compris la tendance au crime.

La forte descendance des paralytiques de parents âgés a été aussi constatée par MM. Marie et Bonnet qui, en 1891, présentant au Congrès de Lyon de 1891 une statistique des facteurs étiologiques de 300 cas de paralysie générale, signalérent parmis les facteurs divers la procréation tardive comme facteur d'arterio-sclérose précoce fréquente.

Il m'a été aussi donné de rencontrer de nombreux cas de longévité chez les ascendants des criminels; et je me souviens de deux frères, l'un homicide et l'autre voleur récidiviste, dont le grand-père paternel était arrivé à l'âge de 110 ans, et qui comptaient d'autres vieillards dans leur famille.

Après avoir obtenu ce résultat chez les dégénérés, j'ai voulu porter mes investigations dans un autre champ d'observations, pour voir si j'en trouvais la confirmation.

Je m'adressai dans ce but à la bonne volonté des instituteurs des écoles élémentaires, qui, après mon invitation, et sans être avertis de la destination des indications que je leur demandais, m'envoyèrent un petit relevé sur l'état intellectuel, sur la conduite en classe et sur le caractère de 917 élèves, dont ils me donnèrent l'âge des parents.

Voici le résultat que j'en obtins pour ce qui regarde la conduite à l'école:

TABLEAU II.

Conduite a l'école des élèves en rapport avec l'âge du père.

Age du père.	Bonne.	Médiocre.	Mauvaise.
25 ans et au-dessous ...	42 = 44%	30 = 31%	22 = 23%
De 26 à 40 ans.....	304 = 47%	216 = 34%	113 = 17%
De 41 ans et au-dessus ...	97 = 51%	60 = 31%	32 = 16%

Parmi les enfants dont le père était au-dessous de 26 ans, nous avons le maximum de mauvaises conduites et le minimum de bonnes, et cela s'accorde avec la turbulence plus grande propre à la jeunesse, transmise aux enfants par les pères qui n'étaient pas encore arrivés à la période de maturité complète à l'époque de la génération.

Ce résultat confirme, par conséquent, l'irrégularité des caractères des enfants nés de pères jeunes. Celui obtenu pour les élèves, fils de pères âgés, semble, au contraire, contredire ce que l'examen des criminels aurait pu faire supposer; cependant il est utile de faire observer que les délits dans lesquels prédominent les descendants de pères âgés, crimes graves de sang et escroqueries, sont commis surtout par des individus qu présentent un délire plus ou moins net de persécution, ou qui montrent une grande habileté de fiction. Or, les personnes atteintes du délire de persécution se trouvent habituellement mieux dans un milieu où règne la discipline qui rend moins

vive la lutte de la vie sociale, qu'en butte à cette dernière, et c'est pour ce motif que des individus de ce caractère se trouvent mieux à l'école, comme, d'autre part, nous les voyons mieux se porter dans la prison. De mes examens sur les crimes commis en prison, il résulte en effet que la classe des délinquants coupables des plus grands crimes de sang, compte parmi celles qui subirent en prison le plus petit nombre de punitions.* Si, au lieu de n' examiner que la conduite, on examine le caractère moral manifesté tel que l' instituteur pût le connaître, les enfants de pères jeunes donnent encore le maximum de caractères irréguliers pour obstination, entêtement, négligence et turbulence; mais si on tient compte seulement des qualités morales d'une perversité vraiment positive: fiction, mensonge querelleur, etc., alors la différence tend à disparaître; et nous ne trouvons plus que 7% de ces caractères mauvais dans cette classe, tandis que les deux autres en fournissent 6% chacun.

L'excédent serait cependant toujours fourni uniquement par le contingent d'enfants nés de pères jeunes. Mais il y a une qualité morale apte à développer une série d'anomalies tardives dans le caractère que le cours de la vie sociale peut plus tard faire naître; c'est l'état habituel de dépression de l'âme, auquel on donne le nom de caractère mélancolique. Sous l'influence de cet état les impressions qui arrivent du dehors, et celles qui s'évoquent à l'intérieur de l'âme, assument très facilment un caractère sentimental pénible; c'est ce qui prédispose l'individu à réagir avec violence contre elles et à se mettre de cette façon en heurt avec les lois.

Or, par les indications obtenues sur les écoliers examinés à ce point de vue au nombre de 364, les proportions des deux qualités de tempérament se trouvent dans l'ordre suivant :—

TABLEAU III.

	Age jeune du père.		Age moyen.		Age avancé.
Humeur gaie des enfants.....	83%	...	68%	...	60%
Humeur mélancolique id.	16%	...	31%	...	33%

Ces chiffres se passent de commentaires : remarquons le rapprochement qui existe entre la deuxième et la troisième catégorie; il laisserait supposer que, peut-être, comme un certain nombre de ceux de la deuxième catégorie côtoient la troisième, la période de déchéance commence pour certains à une époque antérieure à celle que j'ai fixée, au cas où l'hérédité ne devait pas être cherchée du côté de la mère. Le degré d'intelligence démontré par les écoliers examinés (917) dans les diverses catégories par rapport à l'âge des parents, m'a donné les résultats suivants :—

* Coratteri des délinquents, p. 364.

TABLEAU IV.

Intelligence des Ecoliers par rapport a l'age du pere.

Age du père	Bonne	Médiocre	Mauvaise
De-à 25 ans	44 (5 sup) = 48%	22 = 23%	28 (4 inf) = 28%
De-26à 40 ans	247 (46 sup) = 38%	206 = 32%	181 (35 inf) = 28%
De-41à ans	71 (13 sup) = 38%	60 = 31%	58 (14 inf) = 30%

Ainsi qu'on le voit, le premier âge offre une supériorité numérique d'intelligences bonnes sur les deux autres classes, qui s'égalent presque; cependant, si nous considérons plus spécialment parmi les bonnes celles qui se sont montrées supérieures, la plus grande proportion se trouve en faveur de la seconde classe (7%) et nous trouvons encore la proportion de 6% dans la dernière classe supérieure à celle de la première, qui ne monte qu'à 5%. Un tel résultat s'explique facilement, si on considère qu' à l'âge mûr la déchéance intellectuelle ne suit pas immédiatement celle des facultés physique et effectives. La réflexion plus mûre appartient, au contraire, à cet âge, auquel on procrée encore des enfants, et donne aux facultés purement intellectuelles de l'homme une force encore plus grande. Le fait que le plus grand nombre d'enfants intelligents naissent de parents jeunes existe pourtant; et c'est parmi eux que l'on trouve aussi la plus petite proportion d'un moindre développement des facultés intellectuelles (4%) tandis qu'elle atteint 5% dans la seconde classe, et 7% dans celle des enfants de pères âgés.

Ces données, pour ce qui touche les qualités psychiques, obtenues, j'ai voulu rechercher quelle influence on pouvait encore attribuer à l'âge des parents sur les particularités biologiques et physiques des enfants.

Parmi les qualités biologiques, j'ai pris la longévité: et, dans ce but, j'ai obtenu d'examiner les pensionnaires de l'Hospice de Charité de Turin. Laissant à part ceux qui m'étaient signalés comme débiles, j'ai examiné 238 sujets; toutefois, 80 d'entre eux me firent des réponses si peu exactes, que je renonçai à me servir des indications qu'ils me donnèrent; j'en laissai 16 de côté parce qu'ils n'avaient pas encore 70 ans, et j'ajoutai aux 142 autres 47 personnes de mon village, que j'examinai parce qu'elles avaient toutes atteint ou dépassé 70 ans. Divisées en catégories respectives, suivant leur âge propre et celui de leurs parents, ils donnèrent les proportions suivantes.

TABLEAU V.

	Enfants de		
	Pères très jeunes.	Pères à l'âge de complet développement.	Pères à l'âge de déchéance.
Octogénaires	4 = 10% ...	23 = 62% ...	10 = 27%
Septuagénaires	21 = 13% ...	78 = 51% ...	53 = 34%

Comparés aux autres normaux, dont j'ai rapporté plus haut les proportions, il semblerait que chez les gens âgés, les proportions se serait conservées

à peu de chose près comme chez les jeunes, même avec une légère superiorité, tant chez les jeunes que chez les âgés. Il faut cependant rappeler que les individus de cet âge sont nés au temps des guerres de Napoléon,* pendant lesquelles la génération des enfants n'était confiée à peu près qu'aux jeunes encore inaptes au service militaire, ou à ceux qui avaient dépassé l'âge de servir, de telle sorte que les descendants de pères d'âge moyen devaient faire défaut, ou être fils de gens mal constitués et inaptes au service, et par suite incapables de procréer des enfants doués d'une grande vitalité.

Les descendants de parents âgés ont en outre une plus grande probabilité de vivre, parce que l'âge avancé du père les exempte en partie du service militaire. Peut-être aussi leur plus grande circonspection et l'égoïsme plus développé chez-eux sont ils des conditions qui favorisent leur conservation. Un fait saillant toutefois, c'est que parmi les octogénaires on rencontre toujours une plus forte proportion d'individus provenant de pères en pleine vigeur, plutôt que de pères trop jeunes ou trop vieux.

Les notes que j'ai prises en même temps sur l'âge auquel sont morts les parents des sujets que j'ai examinés, me prouvèrent que parmi les parents des octogénaires 4 moururent avant 40 ans, 16 dans l'âge de 41 à 70 ans, 17 au-dessus de 70 ans, c'est-à-dire dans les proportions de 10%, 43%, et 45%, tandis que parmi les septuagénaires, les proportions respectives sont de 8, 46, et 45%. A part la petite différence de septuagénaires de la deuxième classe, nous trouvons que chez tous les vieux, septuagénaires ou octogénaires, il y a une forte proportion de parents qui avaient eu eux-mêmes une notable longévité, ce qui prouve la transmissibilité de cette résistance aux luttes de la vie de pères en fils. Il faut noter toutefois que dans cette énergie même, il se trouve un péril pour l'intégrité de la descendance, parce que la vigueur de la personne, permettant à la faculté génésique de se prolonger, expose la progéniture tardive à la dégénérescence qui peut se manifester par la folie et la criminalité.

Dernièrement, j'ai porté mon attention sur d'autres qualités biologiques des enfants relativement à l'âge de leurs parents; mais le nombre trop restreint des observations ne me permet pas d'arriver à des conclusions probantes présentement.

Dans l'ordre des qualités physiques, j'ai cherché à étudier les rapports qui existent entre les particularités anomales intéressant spécialement la physionomie et la conformation extérieure du crâne de mes examinés avec l'âge de leurs parents.

J'ai divisé ces caractéres dégénératifs en deux classes, suivant qu'ils étaient congénitaux on acquis, subdivisant les premiers en ataviques quand ils reproduisaient des formes d'un type humain inférieur au bestial, telles que l'exagération des sinus frontaux, le torus occipitalis, les oreilles avec les tubercules de Darwin saillants, le front fuyant, etc., ou bien des formes

* Ces études ont été faites en 1883-4.

atypiques dües à des influences morbides de différentes natures et consécutives à des vices de développement du foetus, tel que le type crétinoïde, le goitre congénital, les déviations du nez et les strabismes congénitaux; la plagiocéphalie, l'hydrocéphalie, la mauvaise conformation des dents, etc. L'étude que j'ai faite à ce propos m'a démontré que ceux qui présentaient de préférence les caractères anormaux congénitaux ataviques, descendaient de parents alcooliques et âgés, tandis que les ascendants de ceux qui présentaient plutôt des caractères anormaux atypiques comptaient un plus grand nombre d'alcooliques, d'aliénés et d'épileptiques. Il nous reste maintenant à examiner l'âge de la mère. En adoptant le même critérium que pour les hommes, je réduis la limite de la maturité à 21 ans, limite fixée par la loi pour que le consentement des parents ne lui soit plus nécessaire pour se marier, le développement précoce de la femme respectivement à celui de l'homme étant aussi un fait physiologique. L'âge de la déchéance est de même marqué par une précocité correspondante. Or, en observant les proportions que donnent les mères de mes examinées suivant l'âge respectif dans les trois périodes d'immaturité de parfait développement (que j'ai exagéré peut-être en le supposant égal à la durée de celui des hommes) et de déchéance (qui chez elles devrait commencer à 37 ans) nous trouvons le résultat suivant.

TABLEAU VI.

Proportionnalité des Mères des Normaux, Délinquants et Aliénés.

Dans les diverses périodes d'âge selon l'époque de la naissance.

	Période.		
	d'immaturité.	de plein développement.	de déchéance.
Assassins	6·4	51·8	38·7
Coups et blessures	27·2	57·5	15·1
Viols	15·6	59·3	25·0
Agressions	27·2	63·6	9·0
Incendiaires	—	100·0	—
Filous	12·1	74·2	13·6
Voleurs par effraction ...	19·4	61·1	19·4
Pick-pockets	22·5	64·5	12·0
Vols domestiques	20·0	62·5	17·5
Vols simples	17·9	64·1	17·9
Oisifs et contrevenants à interdiction de séjour	20·0	61·9	17·4
Moyenne générale	18·2	63·7	17·9
Normaux examinés	12·8	76·4	10·7
Aliénés N. 85	20·0	58·8	21·1

La loi que nous avons observée pour les pères dans les différentes classes de criminalité se rencontre encore pour les mères.

Parmi ces dernières nous trouvons la plus grande proportion des mères vieilles pour les assassins et aussi, quoiqu' un peu moindre, pour les coupables de viols ; ce qui expliquerait en partie l'apparente anomalie par laquelle ces derniers ne présentaient pas une prépondérance de pères âgés. La proportion de mères très jeunes prévaut aussi dans les classes des voleurs et des frappeurs chez lesquelles nous avons déjà trouvé la prépondérance de pères jeunes ; elles arrivent au maximun dans la classe des agresseurs ; dans laquelle nous avons trouvé la proportion des pères jeunes très forte, quoique n'atteignant pas le même degré.

Nous trouvons un nombre moindre de mères vieilles parmi les escrocs. De sorte que, s'il était permis de tirer des lois générales d'un nombre aussi restreint d'observations, on pourrait admettre que la mère jouit à un plus haut degré du pouvoir de transmettre aux enfants les facultés émotives plutôt que les intellectuelles, vu que nous trouvons la proportion maxima des mères jeunes pour les classes dans lesquelles on peut admettre que l'émotivité exagérée est la cause la plus puissante qui induit au crime ; tandis que nous ne voyons pas une égale proportion de mères âgées, et, par suite, au jugement mûr et cauteleux, chez les coupables qui fondent sur l'astuce leurs propres actions criminelles.

Chez les aliénés, les formes guérissables, mélancoliques et maniaques se présentent en proportion discrète parmi les descendants de mère jeune 26% ; 59% descendaient d'une mère d'âge moyen ; les descendants de mère âgée se trouvaient, au contraire, en petite proportion, 14%. Dans les formes dégénératives, au contraire, peu nombreux sont les descendants de mère jeune, 60% ; assez nombreux ceux de mère d'âge moyen, 51% et en proportion notable les fils de mère âgées, 40%. Dans les quelques cas de folie morale il n'y avait pas de descendants de mères jeunes, et les mères âgées étaient plus nombreuses que celles d'âge moyen. Enfin, chez les paralytiques nous trouvons 33% de mères vieilles, et 55% d'âge moyen. Chez les écoliers que j'ai examinés, les rapports de la conduite relativement à l'âge des mères, se seraient présentés suivant le petit tableau que voici :—

TABLEAU VII.

Conduite à l'école des élèves en rapport avec l'âge de la mère.

Catégories.	Bonne.	Médiocre.	Mauvaise.
Age de la mère : de-à 21 ans.....	53·9% ...	28·3% ...	17·7%
,, de 22 à 36 ans.....	48·3% ...	33·2% ...	18·4%
,, de 37 à plus ans.....	41·3% ...	41·3% ...	17·2%

La douceur du caractère et la mansuétude plus propre à la femme, spécialement dans sa jeunesse, donnent la proportion maxima de bonnes conduites chez les enfants nés des plus jeunes mères ; et cette qualité va en déclinant à mesure que nous trouvons des mères avancées en âge, quoique dans les conduites mauvaises on ne note presque pas de différence de proportions dépendant des différents âges des mères. Cependant pour 59 écoliers chez lesquels, ainsi que je l'ai dit en parlant de l'âge des pères, on a noté des qualités morales positivement mauvaises, tendance aux altercations, au mensonge, etc., on a constaté dans chaque classe une proportion différente qui va en montant de la plus jeune à la plus âgée : c'est-à-dire, dans la proportion de 4·4% parmi les issus de mères jeunes, de 6·4% parmi ceux nés de mères d'âge moyen, et de 9·1% parmi ceux enfantés par des femmes à la période de déchéance. Si nous réfléchissons en outre que proportionnellement on a exagéré l'extension de la classe moyenne au détriment de la dernière, la différence doit apparaître encore plus grande, en attribuant à cette dernière une proportion plus grande de mauvais caractères.

Si nous nous en tenons aux résultats obtenus par les examens faits sur les écoliers, l'influence de la jeunesse de la mère aurait sur le caractère moral des enfants une action différente de celle du père, qui se révélerait par un plus grand nombre de bonnes qualités ; tandis que le progrès de l'âge de la mère confère à la progéniture des qualités morales toujours pires.

Quant à l'intelligence, les proportions se montrent comme suit :—

TABLEAU VIII.

Intelligence des Eleves par Rapport à l'âge des mères.

Age de la mère.	Bonne (supérieure).	Médiocre.	Mauvaise (infime).
De-à 21 ans.....	43·4 (3·5%)	... 28·3	... 28·3 (3·5%)
De 22 à 36 ans	39·8 (7·8%)	... 31·5	... 28·5 (6·1%)
De 37 à plus ans	31·0 (4·6%)	... 34·4	... 34·4 (5·7%)

L'intelligence plus grande coïnciderait le plus fréquemment avec l'âge plus jeune des mères ; toutefois pas dans ses plus fortes manifestations, dont les proportions les plus élevées seraient en faveur de la deuxième classe, d'abord, puis de la troisième. Cependant en faveur de la première classe existerait encore la proportion minime des intelligences nulles, qui serait à la charge de la classe comprenant les mères d'âge moyen tandis qu'aux mères âgées reviendrait le plus grand nombre d'intelligences inféreures.

Il nous reste en dernier lieu à examiner les cas dans lesquels les parents se trouvent tous deux dans les mêmes conditions d'immaturité, de développement complet, ou de déchéance.

Dans les diverses classes de criminels on eut les résultats suivants :—

TABLEAU IX.

	Période : d'immaturité.	de développ. complet.	de déchéance.
Assassins	0=0%	10=55%	8=44%
Coups et blessures	4=21%	11=57%	4=21%
Viols	0=0%	14=73%	5=26%
Agressions	3=17%	12=70%	2=11%
Incendiaires	0=0%	1=100%	0=0%
Escrocs	2=4%	33=78%	7=16%
Voleurs oisifs et contraventions	20=14%	89=65%	27=19%

Chez les aliénés, nacquirent en proportion tout à fait supérieure de parents âgés tous les deux, les fous moraux, les paralytiques et les hypocondriaques. De couples jeunes ne nacquirent que quatre mélancoliques, un hébéphrénique et un alcoolique. Les maniaques et les mélancoliques descendaient en proportions plus grandes de couples d'âge moyen.

Parmi les écoliers étudiés dans leur conduite à l'école, et dans le degré d'intelligence démontrée, l'union du père et de la mère, tous deux à la période d'immaturité, de complet développement ou de déchéance, donna lieu aux proportions suivantes :—

TABLEAU X.

Période de :	Conduite. Bonne.	Médiocre.	Mauvaise.
Immaturité	15=39%	15=39%	8=21%
Complet développement	268=49%	194=35%	84=15%
Déchéance	26=41%	26=41%	10=16%

TABLEAU XI.

Période de :	Intelligence Bonne.	Médiocre.	Mauvaise.
Immaturité	18=47% (2% supér)	8=21%	12=31% (10% inf.)
Complet dével	215=39% (4% supér)	181=33%	150=27% (6% inf.)
Déchéance	22=35% (3% supér)	19=30%	21=23% (8% inf.)

En confrontant les délinquants avec les normaux, nous pouvons remarquer une première chose : c'est la moindre fréquence de leur issue dans les mariages où l'âge des parents se correspond. Sur les mariages connus, tandis que pour les parents des écoliers le 70% s'etait produit entre individus de la même période de développement, chez les criminels nous ne trouvons que le 63%. Plus grande encore est la différence de proportion des mariages dans les trois phases de développement des parents ; sous ce rapport, les proportions sont les suivantes :—

TABLEAU XII.

	Ecoliers.		Délinquants.
Parents tous les deux à la période d'immaturité...	5·8%	...	11·5%
Parents tous les deux à la période de développement complet	84·5%	...	67·4%
Parents tous les deux à la période de déchéance...	9·5%	...	21·4%

Si nous examinons les différentes classes de délinquants, nous en trouvons trois : celle des assassins, celle des coupables de viol et celle des incendiaires, dans lesquelles manquent totalement les parents ayant tous deux l'âge d'immaturité ; rares aussi sont les frappeurs et les escrocs ; la classe des agresseurs, voleurs et oisifs, au contraire, abonde.

Les parents tous deux âgés se rencontrent, au contraire, dans la classe des assassins et des inculpés de viol, et exception faite pour les incendiaires, dans toutes les classes la proportion dépasse celle des normaux.

Quant aux écoliers, notons qu'avec le jeune âge des deux parents, coïncide le minimum de bonnes conduites et le maximum des intelligences plus développées.

L'âge de développement complet correspond à un maximum de conduites bonnes et à un minimum de mauvaises, et conserve la même proportion de fils intelligents, obtenue par le développement complet de la mère. Dans la période de déchéance, du père et de la mère, les bonnes conduites des enfants se trouvent en moindre proportion que dans la période précédente et les bonnes intelligences en proportion minime.

L'interprétation des conséquences pernicieuses de l'âge trop jeune ou trop avancé des parents sur les caractères psycho-physiques des enfants ne peut apparemment pas présenter de difficultés.

Au jeune âge, l'organisme est encore en voie de formation. Le développement incomplet du squelette ainsi que de tous les autres organes, soustrait continuellement à la circulation sanguine une masse de matériaux plastiques nécessaires à leur formation. L'état cholorotique propre aux jeunes filles grandies maladivement, constitue un condition naturelle de l'organisme à cet âge, non seulement chez la femme, mais aussi chez l'homme, à un degré moins prononcé. Nous pouvons donc considérer et répéter que les vices des enfants nés de parents trop jeunes sont dûs à un développement incomplet par insuffisance de matériaux plastiques.

Si nous voulons, au contraire, découvrir la cause pour laquelle la vieillesse plus ou moins avancée des parents influe de façon désastreuse sur la vitalité des germes et prédispose les descendants aux diverses formes de dégénérescence physique et morale, nous devons la rechercher dans les conditions qui accompagnent l'acheminement vers la vieillesse.

Pendant cette période, nous avons dans les tissus, au lieu du développement et du renouvellement de protoplasme, la tendance à une accumulation de graisse ; et dans tout l'organisme, principalement dans les tissus du système artériel, on trouve une tendance à un dépôt dans leur structure

d'une substance amorphe, qui convertit ces canaux souples et élastiques en tubes rigides ; d'où vient un ralentissement général des fonctions organiques (circulation, oxydation, sécrétion) ; le sang n'arrivant plus au degré d'élaboration, qu'il avait avant, acquiert une plus grande acidité, ne peut plus aussi vite se débarrasser, par la voie ordinaire des émonctoires, des produits de déchet dont il est chargé. En vertu de ces conditions, l'organisme des sénescents subit une espèce d'intoxication lente et graduelle qui, de même qu'elle se révèle en lui par l'alanguissement progressif de toutes ses fonctions, influence d'une façon désastreuse les germes qui s'y développent et les prédispose à devenir des êtres voués à la dégénération.

Par suite, cette cause de dégénération entre dans la catégorie commune des intoxications.

THE INFLUENCE OF THE AGE OF THE PARENTS UPON THE PSYCHO-PHYSICAL CHARACTERS OF THE CHILDREN.

By ANTONIO MARRO.

We note that in nature there prevails a law which governs inheritance throughout the generations of living beings, but its limits and the influences which it obeys are sometimes so obscured from us that they almost verge on mystery.

The question of the transmission of characters by inheritance is of ancient date. As regards physical characters hardly any one denies it, so clear are the proofs given by races and families ; the exceptional cases seem very rare.

Inheritance which relates to moral and intellectual characters is more disputed. We may recall that the ancient Greeks believed in it as is shown by the jealous care which Lycurgus showed in his laws in order to secure the reproduction of the most select men from the point of view of virtue and worth, to whom he wished that every woman might be able to give herself.

Plato also wished to banish from his Republic the sons and the nephews of criminals, and Aristotle, in support of his opinion, cites in his Ethics the example of a wretch who, in order to excuse himself for the bad usage to which he had made his father submit, exclaimed—"My father beat my grandfather. This latter had also ill-used my great-grandfather, and note well, my son, this villain, as soon as he shall have attained the age and strength of an adult, he will spare me neither blows nor assault."

The institutions of monarchy and hereditary nobility have perhaps been founded upon this principle.

The Arabs take account, with jealous care, of the genealogy of their most renowned mares not only for hundreds but for thousands of years.

The stock from whence Vesalius was born was from the time of his great-great-grandfather to that of his father composed of distinguished physicians. The brother of the founder of human anatomy had been himself attracted towards natural science by an inclination so powerful that his parents could not induce him to study Law.

There exists, however, a fact which cannot have escaped the observation of those who have studied the problem of the transmission of characters by means of generation: while one has seen and one sees to-day children inheriting from their parents qualities by which the parents have become eminent, other children, on the contrary, do not correspond at all to this expectation.

By the side of the history of Cimon, son of Miltiades, of Alexander, son of Philip; of the stock of the Scipios; and of the Gracchi; of the De Candolles, of the Darwins, of the Saint-Hilaires, of the Herschells, of the Jussieux, one is painfully surprised to see the sons of Hippocrates handed over for their stupidity to the buffooneries of the comedians,* and one is struck with astonishment in noting that from the race of Socrates and Aristotle there has not arisen the least spark of science, that Charles V., Peter the Great, Napoleon I., had only foolish sons, and many other cases of which history speaks or that one any day may observe in society.

No reason for astonishment then that Dante formerly sang:

> "Rade volte risurge per li rami
> L'umana probitade, e questo vuole
> Quei che la dà, perchè da lui si chiami."

Even in recent times, while Galton wrote a volume to prove that genius derived its origin from families in which it had been so to say prepared and matured, Buckle denied this transmission as contradicted by a thousand facts.†

There exist irrefutable facts in support of both opinions. The influence of inheritance is too evident to be denied, seeing that all observe its results, especially in races and peoples, as for example those of the Gauls and Germans who still preserve to our days the moral qualities noted by Caesar and Tacitus centuries ago. On the other hand there are undeniable facts which, apparently at least, contradict it, and that leads us naturally to recognise that while the law of inheritance really exists there must also exist modifying agencies which turn its influence aside.

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* Galeno, Quod animi vires corporis temperaturas sequuntur, p. 318. Venise, 1709.

† T. H. Buckle, Storia dell'incivilimento in Inghilterra traduzione Italiana, t. I., cap. IV., p. 187. Milano, 1864.

One of the disturbing causes to inheritance, in appearance at least, lies in the fact that the union of characters of the parents is not always homogeneous. Father and mother bring into the act of generation a number of aptitudes, some visible, some latent, which they themselves have received from their parents. If the union is such that the good germs can be added together, then the good qualities of the father and the mother will arrive at a degree of almost surprising development. If, on the other hand, the qualities of the mother are contrasted with those of the father, and *vice versâ*, mediocre children may be born from two distinguished parents.

The effects of this disturbing cause of inheritance, difficult to calculate, are insufficient to explain all the true or apparent anomalies. As a single example those cases would be inexplicable in which there supervenes a difference amounting sometimes to a disparity of characters amongst different children born of the same parents. Consequently one must admit other influences.

Between two acts of generation there may take place and arise modifications in the organs of the parents which must be reflected upon the children who are born.

We have a direct proof of the law in the anomalies found in children of parents who found themselves in anomalous conditions at the time of generation.

In the physical order, Darwin cites a very luminous case: A bull on coming out of the stable had its tail cut off by the door shutting suddenly upon him. All the calves begotten by this bull were born without tails.

The Brown-Séquard experiment, which I myself often repeated, of rendering guinea-pigs epileptic by the re-section of the sciatic nerve, is classical. The young ones which were born were themselves epileptic.

An accidental condition, and sometimes even a temporary condition, of the parents, such as drunkenness, exercises a powerful influence upon generation. Science has henceforth put out of controversy the fact that not only the habitual alcoholism of one or of both parents, but also the simple condition of drunkenness at the moment of the act of generation, suffices to transmit degenerative characters to the children.

The hereditary influence of alcoholism had not escaped the attention of the ancients. Mythological tradition hands down that the deformity of Vulcan was due to the condition of drunkenness of his father, Jupiter, at the moment when he begot him, and according to Plato* the Cartagenians forbade by a law the use of alcoholic liquors to married couples when they wished to procreate children, in order to avoid the disastrous effects transmitted by inheritance.

Morel attributes to the degenerative influence of alcoholism the complete abolition of the moral sense, the diminution of physical sensibility and the destruction of strength.

* Platon. Des Lois. Livre V., p. 128, traduction de V. Conti-Paris, 1831.

Amongst criminals my statistics have given me 46% of children of alcoholics, whilst amongst normal people the children of alcoholics only about 16%.*

During the long years of practice as cantonal physician all the children whom I have seen seized by convulsions had either an alcoholic father or mother, when both were not alcoholic.

I have also wished to find out if other forms of acquired modifications in the character of the parents were transmitted to the children.

In the natural course of life from infancy to youth, to maturity and old age, the human organism necessarily goes through different phases of development, finding itself first of all in course of formation, arriving progressively at a complete development, while then ensues a period of decadence during which it goes on declining and becomes less and less fit for further service. Now the generative activity of man, although it may fail at the first or the second age, includes, nevertheless, a somewhat extended period which commences at an epoch of immaturity or at least of incomplete maturity, and is notably prolonged into the period of decadence. It is natural that children born of the same parents at different phases of their organism should inherit the dispositions belonging to each of these.

It was a fact already known to Aristotle himself that the extreme youth of the parents, especially of the mother, leaves to the children her inheritance of imperfect development and of weakness, of a short stature and of mediocre constitution.

Lucas writes that De la Fontaine, surgeon-in-chief during the last reign in Poland, attributed the extreme physical weakness of the Jews to premature marriages. The same fact can be verified in France. At the beginning of the last century, in the years 1812-13, the inexorable law of conscription drove decimated families to marry their children before the proper age, and never have there been so many cases of rejection for weakness of constitution as in the years 1833-34.

Burdach found in the same reason the explanation of the inferiority which first-born children often present as regards intelligence and aptitude compared to their brothers.†

On the other hand, during old age, man goes on gradually losing, at the same time as his physical energy, a part of his moral energy, and the children born of aged parents must bear the evil influence of the decadence which has already infected the organs of the parents. The Romans had established by law that marriage was prohibited to a man over sixty.

Buffon, in his Histoire Naturelle, on the subject of horses, writes that mares born of old stallions and of old mares show precocious signs of old age.

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* A. Marro, Carrateri dei deliquenti, p. 237.

† Prosper Lucas, Traité philosohpique et physiologique de l'hérédité naturelle p. 439. Paris, 1850.

'From my youth, from what I have observed amongst my comrades, I have suspected that children of aged parents presented abnormal physical and psychical characters from their birth, and as regards this matter I said years ago:* ' The tendency which, especially amongst the educated classes, leads men to contract marriage at a somewhat mature age, must have a notable influence upon the characters of the coming generations. The nutritive activity, the vigour of the heart and of the muscles, the energy of the soul and the force of the spirit will tend by this fact to become weaker and weaker, so as to give place, on the one hand, to nutritive weakness, to tendencies to congestions of the liver, to lithiasis, to the gouty diathesis, to impotence, etc.; and, on the other hand, to narrowness of mind, to the mania of ambition and to a cold egotism which, as we know, go on increasing from youth to old age.' "

The result of observation during my practice as cantonal physician has been that all the children affected by lithiasis whose families I knew were born of aged parents.

There was wanting, however, a real study which should specify the relations between the age of parents and the hereditary qualities of the issue.

In 1883, Ball & Regis† published a comparative study upon the different ages attained by the members of both sexes, of families of neuropaths (epileptics and hysterics), of alcoholics, of lunatics, of paralytics, and of the insane, compared with normal individuals through four generations, that is to say, the grand-parents, the parents, the individuals submitted to an examination with their brothers and sisters, and finally the children and the nephews. From this study they concluded that life is longer amongst the ancestors of the insane than amongst those of normal people and that longevity is greatest amongst the ancestors of general paralytics and alcoholics, amongst whom it reaches notable proportions, whilst among neuropaths and the insane it approaches that of the normal.

Nevertheless, Ball & Regis did not seek to draw from their studies the conclusion which results from them indirectly, that is to say, that the parents of these sick folk, having attained a very advanced age, had often begotten them at an age already mature, which tended to prove that the old age of parents creates a predisposition amongst children to lesions of the brain and spinal cord and to tendencies to alcoholism.

Profiting by an opportunity which was offered to me during the time when I was physician of the Maison de Justice, at Milan, I attempted to make a comparative examination of criminals and persons living in liberty in order to discover if there existed amongst one or the other class differences as regards the age of the parents at the time of generation.

For this purpose I have examined 456 criminals and 1,765 normal individuals, divided into 771 new-born, 917 scholars, and 77 adults; besides,

* A. Marro; Guida all'arte della vita. P. 168. Torino, 1880.

† Les familles des aliénés au point de vue biologique (Encéphale 1883).

I have added 100 insane of the Manicome of Turin, taken by chance amongst the new entries of 1886, amongst whom I have completed this study.

I commenced by classing the age of the parents in three periods, that is to say, immaturity, complete maturity, and decadence. In order to mark the period of immaturity I took as limit the age fixed by legislation after which a man can marry without the consent of his parents, 25 years. I limited the period of perfect development between 26 and 40 years. I marked the period of decadence from 41 years onwards, because oculists admit that presbyopia commences at this age and at this age man has usually a tendency to stoutness, the first indication of the slackening of the vital movement, and as a natural consequence, the decline of the biological powers.

Having thus divided parents of the subjects observed by me according to the different ages, my observations have shown that the number of criminals was in excess amongst the descendants of parents either very young or old, compared with what one observed amongst the people living at liberty.

This result being obtained, I wished to find out if there existed a connection between the special forms of crime in which the characters of the condemned reveal themselves and the peculiarities of character belonging to the different parental ages at which they had been begotten.

The psychical conditions which pre-dispose to criminality consist sometimes in a greater impressionability of character, in consequence of which the mind reacts with great promptitude to the agencies which come to excite it, and offers less resistance to seductions of various kinds which flatter its passions. Sometimes, on the contrary, criminality has its origin in really morbid impulses which take their origin from a condition of depression of mind, from a lack of affectivity or from a delusion of persecution.

Now we can recall that the first conditions predisposing to crime are found in conjunction with the state natural to youth. With youth one usually notes an exaltation of feeling which naturally is found united with incapacity of reflection, lack of foresight, and leads easily to indulgence in pleasure, to an aversion to continued and uniform occupations, which most professional work demands, because the powers are not yet well proportioned, and also to inhibitory mental representations, while it lacks power of resisting impressions which arrive at the common sensorium.

On the contrary, the qualities which mark depression, melancholy, lack of affectivity and a tendency to delusions of persecution, may *a priori* be considered as inherited from two aged parents, because in old age the decline of physical forces is reflected upon the moral forces. Man tends to become discontented with everybody; prudence, circumspection, and egotism become more marked with him. To sum up, in his mind there prevails a condition of depression which deprives him of confidence in his

own powers; in consequence, calculation, suspicion, and avarice tend to take the upper hand if the good education received in youth, mature reflection and the practice of virtue in the preceding years do not come to constitute a solid check against the new tendencies which the progress of the years develops.

These psychical alterations proper to old age, according to the researches made by Kostjurin in the laboratory of Obersteiner at Vienna, should have an anatomical basis consisting of a fatty pigmentary degeneration of the nerve cells of the cortical substances of the cerebral hemispheres, with porous atrophy of the nerve tubes, atheroma of the vessels, condensation of the connective tissue, and the appearance of amyloid corpuscules on the surface of the brain.

Now, the result of my researches as regards the character of criminals in relation to the age of parents at the time of their birth, corresponds to theoretical provisions.

TABLE I.

PROPORTION OF FATHERS OF NORMAL SUBJECTS, CRIMINALS, AND INSANE IN VARIOUS AGES ACCORDING TO THE TIME OF BIRTH.

	Period of immaturity.	Period of full development.	Period of decline.
Normal	8·8%	66·1%	24·9%
Total number of criminals	10·9%	56·7%	32·2%
Assassins	2·9%	44·1%	52·9%
Blows and wounds	13·5%	45·9%	40·5%
Rape	2·7%	66·6%	30·5%
Thieves	15·5%	57·2%	27·1%
Swindlers	2·8%	60·0%	37·1%
Insane	17·0%	47·0%	36·0%

Amongst crimes against property we find a large number of children of young parents, and this was natural. The first motive for theft is not an impulse due to mischievousness which drives an individual to have a prejudice against other people, but rather the love of pleasure, of dissipations and of idleness which are characteristics of youth in which the passions reign and which lacks the curb capable of restraining and controlling them.

I have, however, found one exception. In the class of criminals against property, swindlers, the children of aged parents we find in a notable proportion, whilst the children of young parents were not numerous.

It could not be otherwise. Swindling usually entails long premeditation, and, besides, a great deal of malice, united with a special condition of mind, by which he who commits the crime shows himself rather inclined to bring into action psychical faculties, namely, simulation and hypocrisy in place of physical force, agility, dexterity, and violence.

The former are precisely the characters especially proper to old age, while the latter are particularly those of youth.

We have, in truth, two periods in the life of man in which he is disposed to craft rather than to force. The first corresponds to infancy, when the physical powers are still in defect; the second, advanced age, when the physical powers have commenced to decline. In the former of these two epochs man is not yet fit for generation; with this fitness there comes at youth the impulse to violence.

Amongst swindlers the proportion of children of aged parents is as high as 37%, and if it is not higher the reason is that many of them have committed this crime at an advanced age when they had already acquired, with the experience of life, the special qualities which predispose to this type of crime.

With the true swindlers the proportion rises to 56% if one includes with those who are descended from parents advanced in age, the criminals who are themselves aged.

So the saying of Quetelet, that swindling is the crime of mature age, turns out, according to my researches, to be profoundly true, if one adds the influence of the age at generation.

I observed not long ago a new case which admirably served to prove the tendency to swindling inherited from aged parents. It concerned an individual 25 years of age, accused of different forms of swindling. He was a son of parents, both of them aged, the father being more than 50 at his birth and the mother 42. This latter was also a neuropath. The son grew up with clear evidences of moral defect, obtuse intelligence, dislike of work, and a tendency to thieve. At the age of eleven years he rifled his mother's house, then got himself gagged and bound upon a chair by an accomplice in order to make his mother believe that strange thieves had entered the house and made it impossible for him to give the alarm while they carried off the goods which were missing. Justice revealed the deceit and the child was condemned to prison. At a later period, to his moral defects were added morbid manifestations of another kind, but the inclination towards crime was revealed afresh by swindles of different kinds which brought him a second time into the dock.

In crimes against the person, as might have been expected, I have found a greater number amongst the children of aged parents. Assassins, homicides, those who show the most complete absence of affective feelings and frequently a more or less clear delusion of persecution, gave the enormous proportion of 52.9% of children of fathers of advanced age, a proportion much greater than that given by any other class of criminals, and the proportion remains great both for aged fathers and aged mothers who appear in their ancestry as 38% against 17% presented by normal people.

The most violent assassins that I have had occasion to study have had a father or mother or both aged. One of them, a son of parents, both

of whom were aged, seeing his sister making fun of his lameness, after having attempted an assault upon her, seized a club and crushed her head. He boasted to me of the effect of his blow. Another assassin was also the son of aged parents—an assassin who, in company with an accomplice, drew a passer-by into a wood in order to kill and rob him; also a third, who killed the father of a young girl whom he wished to violate.

The children of young parents are found in very small proportion amongst the assassins and homicides. I only find 3% of these as children of a young father.

The proportion of aged fathers is somewhat remarkable, namely 40%, amongst those condemned for blows and injuries; but we find also amongst them an increase in the number of the children of young parents; it is greater than the proportion of the normal, and reaches 13.5%.

This is natural, because when it is a question of slight injuries or brawling, the lack of affectivity may be as much the cause as the untamed character, resenting offence with what seems to youth a natural promptitude, or from alcoholic excitement, whilst with the assassin who meditates a blow and pushes the re-action as far as to take his adversary's life, the affective feelings must always be profoundly altered.

One class of criminals in which the children of aged parents do not predominate so clearly, is that of persons guilty of rape, of whom the proportion is from 30%. We have, nevertheless, in compensation, a greater number of aged mothers.

Amongst the insane I have found that all the children born of fathers either too young or too old show a large proportion as compared with normal people and with criminals taken in general. The number which I have observed (100) does not allow of the deduction of well-founded conclusions upon the relation of different forms of mental defect with the age of the parents. I have found, however, that the forms of insanity most easily curable, the pure melancholies and the manias, give relatively to the normal a rather higher proportion of young fathers (15%), children of middle-aged fathers rather less (59%), and an almost equal number of children of aged fathers (25%). In the degenerative melancholic forms of insanity the proportion of children of aged fathers attains the maximum; two patients, the subjects of hypochondriac insanity, had been begotten by men of whom one was 56 and the other 61, while the mothers were only 38 and 34.

In the other degenerative forms of insanity—paranoia, moral insanity, hebephrenia, epilepsy—we have also a larger number of children of aged fathers, 47%, whilst we find 37% of children of middle-aged fathers, and 17% of children of too young fathers. Moral insanity is distinguished amongst all by the high proportion of children of aged fathers; 5 in 7 persons examined by me were found in this class, of whom 3 also had an

aged mother: one whose father was 40 years of age, and the other had as father a man of 21. In the total number of young insane people the descendants of aged fathers is shown in a proportion of 41% and of 20% for the mothers; greater than, as I have already shown, the average of the insane in general, which proves a greater frequency of generative defect amongst young insane people.

Amongst general paralytics children of aged fathers are also numerous, namely, 44%. In this class the children of young fathers are found in the smallest proportion, 10%. A paralytic, a son of a somewhat young father, 27 years of age, had had amongst his ancestors cases of singular longevity; his great-great-grandfather on the father's side had arrived at the age of 116 years, as the wife of the patient told me, and his grandmother, who, I believe, is still living, is 99. This proves the exactness of the observation of Ball & Regis upon the longevity of the ancestors of this class of patient, and confirms my notion as regards the influence of the advanced age of parents upon the appearance amongst the children of various psychopathies, including amongst them the tendency to crime.

The marked descent of paralytics from aged parents has been also proved by MM. Mari & Bonnet, who in 1891, in presenting to the Congress at Lyons of 1891 statistics of etiological factors of 300 cases of general paralysis, noted amongst various factors a late procreation as a cause of frequent early arterio-sclerosis.

It has also been my fortune to meet numerous cases of longevity amongst the ancestors of criminals. I recollect two brothers, one a homicide and the other a habitual thief, whose paternal grandfather had reached the age of 110, and who reckoned other centenarians amongst his family.

Having obtained this result amongst degenerates I wished to carry my investigations into another field of observation in order to see if I could there obtain confirmation of them.

With this end I made appeal to the goodness of the managers of elementary schools, who, after my invitation, without being informed of the object of the information which I requested, sent me a little abstract upon the intellectual condition, conduct in class and character of 917 pupils, of whom they gave me the age of their parents.

Here is the result which I have obtained as regards their conduct at school:

TABLE II.

Conduct at School of Pupils in Relation to the Age of the Father.

Age of the Father.	Good.	Mediocre.	Bad.
25 years and below ...	42 = 44%	30 = 31%	22 = 23%
26 to 40 years ...	304 = 47%	216 = 34%	113 = 17%
41 years and over ...	97 = 51%	60 = 31%	32 = 16%

Amongst children whose fathers were less than 26 years we have the maximum of bad conduct and the minimum of good, and that corresponds with the greater turbulence characteristic of youth and transmitted to children by fathers who have not arrived at the period of complete maturity at the time of generation.

This result confirms consequently the irregularity of the characters of children born of young fathers. The result obtained for pupils, children of aged fathers, seems, on the contrary, to contradict that which the examination of criminals had led one to suppose; however, it is useful to observe that the crimes in which the descendants of aged fathers show a predominance, grave crimes of blood-shed and swindling, are specially committed by individuals who show a more or less clear delusion of persecution, or who show a great facility for lying. Now persons affected by the delusion of persecution are always better in surroundings where discipline is maintained, in which the struggle of social life is less active, than when exposed to this struggle; and it is for this reason that individuals of this character are better at school, as from another point of view, we see them better in prison. From my enquiries regarding crimes committed in prison it appears that the class of criminals capable of the greatest crimes of blood-shed are reckoned amongst those who undergo the smallest number of punishments in prison.* If, instead of only examining the conduct, one examines the moral character shown, such as the schoolmaster can recognise it, the children of young fathers give the maximum of irregular characters as regards obstinacy, stubbornness, negligence and turbulence; but if one takes account only of the moral qualities showing a true positive perversity, deceit, lying, quarrelsomness, then the difference tends to disappear, and we only find 7% bad characters of this class, while the other two classes furnish 6% each.

The excess, however, would always be furnished entirely by children born of young fathers, but there is a moral quality apt to develop a number of abnormalities of character which the course of social life will make apparent; it is the habitual condition of depression of mind to which one calls a melancholy character. Under the influence of this condition the impressions which arrive from without and those which are evoked from within too easily assume a painful character, which predisposes the individual to react violently against them and to place himself thus in conflict with the laws.

Now by the indications obtained from the scholars examined from this point of view, of the number of 364 the proportions of the two kinds of temperament were found in the following order :—

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* Caratteri dei delinquenti, p. 364.

TABLE III.

	Youthful age of father.	Middle Age.	Advanced Age.
Cheerful temperament of the children	83%	68%	60%
Melancholy temperament of the children	16%	31%	33%

These figures need no commentary. Let us note the approximation which exists between the second and the third categories: it might lead one to suppose, perhaps, that as a certain number of those of the second category kept close to the third, the period of decline commences for some of them at an earlier epoch than that which I have fixed in the case where inheritance cannot be sought on the mother's side. The degree of intelligence shown by the scholars examined (917) in the different categories in relation to the age of the parents has given the following results:—

TABLE IV.

Intelligence of Scholars: In Relation to the Age of the Father.

Age of Father.	Good.	Medium.	Bad.
Up to 25 years	44 (5 above)= 48%.	22=23%	28 (4 below)= 28%.
From 26 to 40 years ...	247 (46 above)= 38%.	206=32%	181 (35 below)= 28%.
From 41 years and over...	71 (13 above)= 38%.	60=31%	58 (14 below)= 30%.

As one sees, the first age shows a numerical superiority of good intelligences over the other two classes, which are almost equal; however, if we consider more particularly amongst the good, those who are shown to be superior, the greatest proportion is found in favour of the second class (7%), and we also find the proportion of 6% in the last class superior to that of the first, which only amounts to 5%. Such a result is easily explained if one considers that at mature age intellectual decline does not immediately follow the decline of the physical and emotional faculties. More mature reflection belongs, on the contrary, to this age at which children are still begotten and gives a still greater force to the pure intellectual faculties of man. The fact that the greatest number of intelligent children are born from young parents, nevertheless remains, and it is amongst these, also, that one finds the smallest proportion of an inferior development of intellectual faculties (4%), whilst it attains 5% in the second class and 7% in that of children of aged fathers.

These results being obtained as regards psychical qualities, I wished to enquire what influence could be attributed to the age of the parents upon

the biological and physical peculiarities of the children. Amongst the biological qualities I have taken longevity, and with this view I have examined the inmates of the Hospice de Charité of Turin. Leaving aside those who were pointed out to me as feeble, I examined 238 subjects. Nevertheless, 80 of these gave me such inexact replies that I did not use the information which they gave me. I put on one side 16, because they were not yet 70 years of age, and I added to the 142, 47 other persons of my village whom I examined because they had all attained or passed the age of 70. Divided into respective categories, according to their own age and that of their parents, they gave the following proportions :—

TABLE V.

	Children of		
	very young fathers.	fathers at the age of complete development.	fathers at the age of decline.
Octogenarians ...	4 = 10%	23 = 62%	10 = 27%
Septuagenarians ...	21 = 13%	78 = 51%	53 = 34%

Compared to other normal people, of which I have previously given the proportions, it would seem that amongst aged people the proportions are preserved almost as with the young, even with a slight superiority, as well with the young as with the old. It must, however, be recalled that the individuals of this age were born in the time of the Wars of Napoleon,* during which the procreation of children was almost confined either to young parents, still unfit for military service, or to those who had passed the age of service; so that the descendants of fathers of middle age either failed or were children of persons of bad constitution unfit for service, and, in consequence, incapable of begetting children of a high degree of vitality.

The descendants of aged parents have, besides, a greater probability of survival, because the advanced age of the father exempts them in part from military service. Perhaps, also, their greater prudence and more developed egotism are conditions which favour their preservation. It is a striking fact, nevertheless, that amongst octogenarians one always meets a larger proportion of individuals the offspring of fathers in full vigour rather than of fathers too young or too old.

The notes which I have taken, at the same time, upon the age at which the parents of the subjects of whom I have examined died, prove to me that among the parents of octogenarians four died before 40, sixteen in the age from 41 to 70, seventeen above 70, that is to say, in the proportions of

* These studies were made in the year 1883-84.

10%, 43%, and 45%, whilst amongst the septuagenarians the respective proportions are 8%, 46%, and 45%. Apart from the small difference of the septuagenarians of the second class, we find that amongst almost all the aged, septuagenarians or octogenarians, there is a high proportion of parents who were themselves notable for longevity, which proves the transmission of this capacity for resistance to the struggle of life from fathers to sons. It must be noted, however, that in this very energy there is found a risk for the integrity of the descendants, because the vigour of the individual permitting the prolongation of the generative faculty exposes the late offspring to the risk of degeneration, which can manifest itself by madness or criminality.

Lastly, I have directed my attention to other biological qualities of children relative to the age of their parents, but the insufficient number of my observations does not permit me to arrive at present at decisive conclusions.

As regards physical qualities, I have endeavoured to study the relations which exist between the anomalous characteristics relating specially to physiognomy and the exterior conformation of the skull of the persons examined by me with the age of their parents.

I have divided these degenerative characters into two classes, according as they were congenital or acquired, subdividing the former into atavic when they reproduced forms of inferior human or bestial type, such as the exaggeration of the frontal sinuses, the torus occipitalis, ears with the projecting tubercles of Darwin, the receding forehead, or else atypical forms due to morbid influences of different kinds, and the results of errors of development of the fœtus, such as the cretinoid type, congenital goitre, deviations of the nose and congenital strabismus, plagiocephaly, hydrocephalus, bad formation of the teeth. A study which I have made in this matter has shown me that those who show a majority of abnormal congenital atavic characters are descended from alcoholic or aged parents, whilst the ancestors of those who presented rather abnormal atypical characters reckoned a greater number of alcoholics, of insane and epileptics.

It now remains for us to examine the age of the mother. In adopting the same criterion as that adopted for the men, I reduce the limit of maturity to 21 years, the limit fixed by the laws when the consent of the parents is not necessary for marriage, the earlier development of the woman as compared to the man being a physiological fact. The age of decline is also marked by a corresponding precocity. Now, in noting the proportion given by the mothers of persons examined by me, according to their respective age, in the three periods of immaturity, perfect development (which I have perhaps exaggerated in supposing it equal to the duration of that of the man), and of the decline (which with them must commence at 37 years), we find the following result:—

TABLE VI.

Proportion of Mothers of Normal People, Criminals, or Insane in the different periods of age according to the epoch of birth.

	Period of immaturity.		Period of full development.		Period of decline.
Assassins	6·4	...	51·8	...	38·7
Blows and injuries	27·2	...	57·5	...	15·1
Rapes	15·6	...	59·3	...	25·0
Assaults	27·2	...	63·6	...	9·0
Arson	—	...	100·0	...	—
Sharpers	12·1	...	74·2	...	13·6
Burglars	19·4	...	61·1	...	19·4
Pickpockets	22·5	...	64·5	...	12·0
Domestic thieves	20·0	...	62·5	...	17·5
Simple thieves	17·9	...	64·1	...	17·9
Idlers and breakers of laws forbidding residence	20·0	...	61·9	...	17·4
General average	18·2	...	63·7	...	17·9
Normal persons examined	12·8	...	76·4	...	10·7
Insane numbering 85 ...	20·0	...	58·8	...	21·1

The law which we observed for the fathers in different classes of criminality is also met with amongst the mothers.

Amongst the last we find the largest proportion of aged mothers for assassins, and also, though in smaller proportion, for those guilty of rape, which would explain in part the apparent anomaly by which these latter do not present a preponderance of aged fathers. A proportion of very young mothers prevails also in the class of thieves and of beaters, amongst whom we have already found a preponderance of young fathers; they reach their maximum in the class of assaulters in which we have found the proportion of young fathers very high, although not attaining the same degree.

We find a smaller number of aged mothers amongst swindlers, so that if it were permitted to draw general conclusions from so limited a number of observations, one might admit that the mother has a higher capacity of transmitting emotional qualities to children rather than intellectual; seeing that we find the maximum number of young mothers for the classes in which that emotional excess is the most powerful cause promotive of crime, whilst we do not see an equal proportion of aged mothers, and, consequently, of mature and cautious judgment, amongst criminals who base their actions upon craft.

Amongst the insane, the curable forms, the subjects of melancholy and mania appear in moderate proportion amongst the descendants of young

mothers, 26%; 59% from the mothers of middle age; the descendants of aged mothers were found, on the contrary, in small proportion, 14%. In the degenerate forms, on the contrary, the descendants of a young mother are not numerous, 60%; somewhat numerous those of the mothers of middle age, 51%; and a notable proportion the children of aged mothers, 40%. In cases of moral insanity there were no descendants of young mothers, and the aged mothers were more numerous than those of middle age. Finally, amongst the paralytics we find 33% of old mothers and 55% of mothers of middle age. Amongst the scholars whom I have examined the reports regarding their conduct relative to the age of their mothers will be presented according to the following little table :—

Table VII.

Conduct at School of Pupils in Relation to Age of the Mothers.

Categories.	Good.	Medium.	Bad.
Age of the mother: to 21 years ...	53·9%	28·3%	17·7%
„ „ from 22 to 36 years	48·3%	33·2%	18·4%
„ „ from 37 and over	41·3%	41·3%	17·2%

The gentleness of character proper to women, especially in youth, gives the maximum proportion of good conducts among children born of the youngest mothers, this quality decreasing in proportion as we find mothers advancing in age, although in the bad conducts column one hardly notices any difference in the proportions depending on the different ages of the mothers. However, as regards 59 scholars amongst whom, as I have said in speaking of the age of the fathers, one has noted positively bad moral qualities, a tendency to quarrels, to lying, one has observed in this class a different proportion which increases from the youngest to the oldest; that is to say, in the proportion of 4·4% among the children of young mothers, of 6·4% amongst those born of mothers of middle age and of 9·1% amongst children borne by women at the period of decline. If we reflect besides that we have proportionately exaggerated the extension of the middle class to the loss of the last the difference must appear still greater in attributing to this last a greater proportion of bad characters.

If we take account of the results obtained by the examinations made upon the scholars, the influence of the youth of the mother should have a different effect upon the moral character of the children from that of the father, which would reveal itself by a greater number of good qualities, whilst the increase in age of the mother confers on the offspring all these worst qualities.

As regards intelligence, the proportions show themselves as follows :—

TABLE VIII.

Intelligence of Pupils in Relation to the Age of the Mothers.

Age of the Mother.	Good (superior).	Medium.	Bad (lowest).
Of 21 years	43·4 (3·5%)	28·3	28·3 (3·5%)
From 22 to 36	39·8 (7·8%)	31·5	28·5 (6·1%)
From 36 or 37 and over	31·0 (4·6%)	34·4	34·4 (5·7%)

The greater intelligence would coincide most frequently with the younger age of the mothers; nevertheless not in its most evident manifestations, of which the higher proportion would be in favour of the second class first and then of the third. Nevertheless, in favour of the first class, the minimum proportion of defective intelligences would exist which would be at the cost of the class including the mothers of middle age, whilst the greatest number of inferior intelligences would belong to the aged mothers.

It now remains in the last place to examine the cases in which both the parents are found in the same conditions of immaturity, complete development and of decline.

In the different classes of criminals one had the following results :—

TABLE IX.

	Period of immaturity.	Period of complete development.	Period of decline.
Assassins	0=0%	10=55%	8=44%
Blows and injuries	4=21%	11=57%	4=21%
Rapes	0=0%	14=73%	5=26%
Assaults	3=17%	12=70%	2=11%
Arsons	0=0%	1=100%	0=0%
Swindlers	2=4%	33=78%	7=16%
Thieves, idlers, and law-breakers	20=14%	89=65%	27=19%

Amongst the insane, there were born of parents, both aged, a decidedly larger proportion of moral lunatics, paralytics, and hypochondriacs. Of young couples only four melancholics were born, one hebephreniac, and one alcoholic. Subjects of mania and melancholy were descended in great proportion from middle-aged couples.

Amongst pupils studied as regards their conduct at school and as regards the degree of intelligence shown, the union of father and of mother both at the period of immaturity, of complete development, and of decline gave place to the following proportion :—

Table X.

Period of:	Conduct: Good.	Medium.	Bad.
Immaturity	15=39%	15=39%	8=21%
Complete development	268=49%	194=35%	84=15%
Decline	26=41%	26=41%	10=16%

Table XI.

Period of:	Intelligence: Good.	Medium.	Bad.
Immaturity	18=47% (2% above)	8=21%	12=31% (10%below).
Complete development	215=39% (4% above)	181=33%	150=27% (6% below).
Decline	22=35% (3% above)	19=30%	21=23% (8% below).

In comparing criminals with normal people we can note one preliminary fact, namely, the lesser frequency of their issue in marriages where the ages correspond. In marriages known to us, whilst for parents of scholars 70% were produced amongst individuals of the same period of development, amongst criminals we found only 63%. Greater still is the difference in the proportion of marriages in the three phases of development of the parents; under this head the proportions are the following:—

Table XII.

	Scholars.	Criminals.
Parents both at the period of immaturity	5·8%	11·5%
„ „ „ complete development	84·5%	67·4%
„ „ „ decline	9·5%	21·4%

If we examine the different classes of criminals we find there are three: that of assassins, those guilty of rape and those guilty of arson, in which parents, both of immature age are entirely wanting. Rare also are the beaters and swindlers, while the class of assaulters, thieves, and idlers, abound.

Parents both of them aged, are, on the contrary, met with in the class of assassins and those accused of rape, and making exception for arsons, their proportion exceeds that of the normal in all the classes.

As regards the scholars, let us note that with the youth of the two parents there coincides with the minimum of good conducts and the maximum of the most developed intelligences.

The age of complete development corresponds to a maximum of good conducts and a minimum of bad, and preserves the same proportion of intelligent sons obtained by the complete development of the mother. In the period of decline of the father and mother the good conducts of children are found in less proportion than in the preceding period and the good intelligences in minimum proportion.

The interpretation of the pernicious consequences of an age too young or too advanced in the parents upon the psychophysical characters of the children cannot present any difficulties.

In youth the organs are still in course of formation. The incomplete development of the skeleton, as well as the other organs, continually withdraws from the circulation of the blood a mass of plastic materials necessary for their formation. The chlorotic state of young women who have grown up in bad health constitutes a natural condition of the organs at that age not only in the female sex, but also in the male sex in a less pronounced degree. We can then consider and affirm that the defects of children who are born of too young parents are due to incomplete development owing to insufficiency of plastic materials.

If we wish, on the contrary, to discover the cause how the more or less advanced age of the parents has a disastrous influence upon the vitality of the germs and predisposes the offspring to various forms of physical and moral degeneracy, we must seek it in the conditions which accompany the passage towards old age.

During this period we have in the tissues, in place of the development and renewal of protoplasm, a tendency to the accumulation of fat; and in the whole organism, especially in the tissues of the arterial system, one finds a tendency to a deposit in their structure of an amorphous substance, which converts these flexible and elastic canals into rigid tubes, whence results a gradual slackening of the organic functions (circulation, oxidation, and secretion); the blood, no longer attaining to a degree of elaboration which it had before, acquires a greater acidity and cannot so quickly relieve itself by the ordinary path of the emulctories of the products of waste with which it is charged. In consequence of these conditions the organism of old people undergoes a species of slow and gradual intoxication, such as is revealed by a gradual slackening of all the functions, and influences in a disastrous manner the germs which are in course of development, and predisposes them to become creatures destined to degeneration.

Consequently, this cause of degeneration enters into the common category of intoxications.

GENETICS AND EUGENICS.

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Owing to the complete paper not being available for publication an abstract only is included.

To the student of genetics, man, like any other animal, is material for working out the manner in which characters, whether physical or mental, are transmitted from one generation to the next. Viewed in this way he must be regarded as unpromising, not only from the small size of his families, the time consumed in their production, and the long period of immaturity, but also because full experimental control is here out of the question. For these reasons man is of interest to the student of genetics, chiefly in so far as he presents problems in heredity which are rarely to be found in other species, and can only be studied at present in man himself. The aim of the Eugenist, on the other hand, is to control human mating in order to obtain the largest proportion of individuals he considers best fitted to the form of society which he affects. It is evident that to do this effectually he must have precise knowledge of the manner in which transmission of characters occurs, and more especially of those with which he particularly wishes to deal. Precise knowledge is at present available in man for relatively few characters; and those characters, such as eye, colour, and certain somewhat rare deformities, are not the kind on which the Eugenist lays great stress. The one instance of eugenic importance that could be brought under immediate control is that of feeble-mindedness. Speaking generally, the available evidence suggests that it is a case of simple Mendelian inheritance. Occasional exceptions occur, but there is every reason to expect that a policy of strict segregation would rapidly bring about the elimination of this character.

There is reason to suppose that many human qualities are more complicated in their transmission, and it is probable that certain phenomena now being studied in plants and animals will throw definite light upon man. Though characters are frequently transmitted on the Mendelian scheme quite independently of one another, there are cases known in which they are linked up more or less completely in the germ cells with the determinant of a particular sex. Sex-limited inheritance of this nature has been carefully worked out in particular cases in Lepidoptera and poultry. As yet there is much to be learnt in this direction, and further progress may be expected to lead eventually to a precise knowledge of the mode of transmission of many human defects, such as colour-blindness and hæmophilia. It is not unlikely that a similar mode of transmission will be found to hold good for many human characters usually classed as normal.

Another set of phenomena which will probably be found of importance in the heredity of man are those included under the terms "coupling"

and "repulsion." Characters, each exhibiting simple Mendelian segregation, may become linked together more or less completely in the process of heredity, or the reverse may occur. Our knowledge of these phenomena is at present almost completely confined to cases in plants, but evidence is beginning to be obtained for their occurrence in animals. It is not unlikely that they will be found to play a considerable part in human heredity. For one of the most noticeable things about man is the frequency with which children resemble one or other parent to the seemingly almost complete exclusion of the other. In view of the mongrelisation of the human race, the frequency of these cases is very remarkable, and can hardly fail to suggest that some sort of coupling between characters plays a large part in human heredity.

Except in very few cases, our knowledge of heredity in man is at present far too slight and too uncertain to base legislation upon. On the other hand, experience derived from plants and animals has shewn that problems of considerable complexity can be unravelled by the experimental method, and the characters concerned brought under control. Though the direct method is hardly feasible in man, much may yet be learnt by collecting accurate pedigrees and comparing them with standard cases worked out in other animals. But it must be clearly recognised that the collection of such pedigrees is an arduous undertaking demanding high critical ability, and only to be carried out satisfactorily by those who have been trained in and are alive to the trend of genetic research.

Section II.

Practical Eugenics.

Section IIa.

Education and Eugenics.

RAPPORT SUR L'ORGANISATION PRATIQUE DE L'ACTION EUGENIQUE.

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L'étude de la physiologie et de l'hygiène de la reproduction humaine sollicite spécialement depuis quelques années l'attention d'un grand nombre de savants. La constatation systématiquement faite de la dégénérescence, a permis d'apprécier l'importance pratique de cette étude jusqu'ici fortement négligée, par suite des mœurs et des préjugés qui faisaient considérer les fonctions de reproduction chez l'homme, comme présentant un caractère spécial qui en rendait l'étude difficile en dehors du milieu médical.

Aujourd'hui on peut aborder, même devant le grand public, l'examen des questions relatives à l'hygiène de la reproduction, comme on aborde l'examen des questions qui intéressent l'hygiène de la nutrition ou l'hygiène du travail.

Le Congrès international eugénique, succédant au congrès de génétique (Paris, 1911) et au congrès pour l'étude de la généalogie et de l'hérédité (Giessen, avril, 1912), montre bien l'intérêt que provoque actuellement, dans tout les pays, le problème de l'amélioration de la race humaine.

On peut entrevoir dès maintenant, le moment où la lutte contre la dégénérescence et pour l'amélioration de la race pourra être systématiquement organisée. On peut se demander comment devrait être pratiquement organisée l'action eugénique, dont l'objet doit être à la fois l'étude des causes pouvant être soumises au contrôle social et susceptibles d'améliorer ou d'affaiblir les qualités de race des générations futures, la connaissance des faits d'hérédité et l'action des institutions sociales sur la transformation de la race, enfin, la vulgarisation et l'application des connaissances acquises.

La lutte directe contre la transmission héréditaire des anomalies présente encore de grandes difficultés pratiques; mais il est possible de combattre dans une certaine mesure les causes des anomalies qui surviennent au cours du développement de l'individu et qui dépendent des conditions dans lesquelles se fait ce développement. Ces conditions dépendent elles-mêmes du milieu physique et du milieu social qui, par suite de leur complexité

croissante, peuvent créer des obstacles de plus en plus nombreux à l'évolution normale de l'individu, en même temps qu'ils l'astreignent à acquérir des aptitudes toujours plus grandes et plus variées.

Pour combattre l'action nuisible du milieu sur le développement de l'individu, il semble que ce qui importe le plus, c'est d'organiser systématiquement le contrôle de ce développement. Il n'est pas difficile de démontrer que l'observation systématique de l'enfant permettrait de constater dans bien des cas, l'insuffisance absolue ou relative des aptitudes reproductrices des parents, résultant, soit de l'existence d'une maladie ou d'une tare transmissible, soit d'une ignorance des conditions susceptibles d'altérer, tout au moins momentanément, l'équilibre physiologique des parents et d'amener la production chez l'enfant d'anomalies plus ou moins importantes.

Que de fois, le médecin n'assiste-t-il pas impuissant aux naissances successives d'enfants fatalement voués à la maladie ou à la dégénérescence, le plus souvent par suite de la tuberculose, de la syphilis, de l'alcoolisme ou simplement de la misère physiologique des parents ! Que de fois le médecin n'est-il pas sollicité par de jeunes parents, dont l'éducation eugénique est nulle et qui sont alarmée par la constatation d'anomalies survenues au cours du développement d'un premier enfant !

Par un contrôle régulier du développement, il serait souvent possible de déterminer les dangers de la transmission héréditaire des maladies et des tares, et il serait souvent possible d'en prévenir les effets en empêchant de nouvelles naissances, lorsque la production de dégénérés est certaine.

L'organisation du contrôle faciliterait d'ailleurs la vulgarisation des notions élémentaires d'eugénisme dont la connaissance pourrait assurer, dans une certaine mesure, la prévention des conséquences évitables d'une inaptitude reproductrice momentanée ou définitive des parents.

Il n'est pas douteux que par la généralisation d'une observation méthodique de l'enfant, ou pourrait faciliter la détermination des mesures à prendre pour assurer dans les sociétés humaines une sélection relative et se rapprocher ainsi de l'idéal eugénique entrevu par Galton.

Les anomalies du développement de l'enfant sont souvent la conséquence de l'insuffisance des aptitudes éducatrices des parents. Et, s'il est vrai qu'il est encore actuellement difficile d'envisager la possibilité de combattre systématiquement la dégénérescence due à l'hérédité, il semble que la lutte contre les anomalies du développement, dues à l'insuffisance de l'education, puisse être efficacement poursuivie.

Déjà, la morbidité et la mortalité infantiles, causées notamment par l'erreur de l'alimentation du nouveau-né ont été considérablement diminuées, grâce au contrôle méthodiquement organisé des nourrissons. Pour certaines catégories de nourrissons, le contrôle a même pu être rendu obligatoire.

Déjà, aussi, le contrôle des écoliers, là où il est sérieusement organisé, a permis de prévenir dans une large mesure, les dangers d'un régime scolaire inadapté aux besoins de l'enfant.

Enfin, certaines catégories de travailleurs sont soumises, même parfois obligatoirement, à un contrôle médical.

Mais, ces interventions restent cependant limitées à un très petit nombre d'individus et le plus souvent à une partie seulement de la période de leur développement.

Pour garantir à tous les enfants un milieu éducatif approprié tant dans la famille, qu'à l'école ou à l'atelier, il apparaît comme tout à fait indispensable de généraliser l'organisation du contrôle périodique.

Cette généralisation est d'autant plus nécessaire que par suite des progrès de la civilisation, la complexité du milieu social s'accroît constamment, en même temps que se modifient et se compliquent les conditions du milieu physique. Il en résulte inévitablement des difficultés plus grandes pour le développement de l'enfant et un risque plus grand d'anomalies.

Que le milieu social se complique de plus en plus et que cette complication progressive soit de nature à rendre plus difficile le développement de l'enfant, cela est évident ! Dans la famille, les nécessités de la vie moderne, dispersent souvent les parents, au point qu'un grand nombre d'enfants ne bénéficient que dans une très faible mesure de la bienfaisante influence éducative d'un bon milieu familial. Souvent le nouveau-né doit être placé en nourrice ou à la crèche, notamment lorsque la mère est astreinte à un travail professionnel qui impose le plus souvent l'abandon partial ou complet de l'allaitement maternel. Que d'enfants pour lesquels le milieu familial est inexistant, véritables orphelins, passant successivement à la crèche, à l'école, et à l'atelier, sans avoir trouvé dans la famille les excitants appropriés à leurs besoins !

Comme le milieu familial, le milieu scolaire expose aussi l'enfant à de nombreux dangers ; le malmenage notamment est devenu presque inévitable, par suite de l'accroissement constant des connaissances, dont l'acquisition est utile, et qui détermine la surcharge excessive des programmes. Cependant parmi les circonstances susceptibles de favoriser le développement de l'enfant, en est généralement d'accord pour placer en première ligne l'acquisition d'un minimum d'instruction. La reconnaissance par la société du droit de l'enfant à un minimum d'instruction est généralement admise et le temps n'est certainement pas éloigné, où, dans tous les pays, ce droit à l'instruction sera consacré par la loi.

Mais, toute loi reste inefficace sans un contrôle rigoureux de son application. Il suffit pour s'en convaincre, de constater notamment les résultats obtenus dans les pays où l'instruction est obligatoire depuis longtemps, mais où il n'existe aucune organisation chargée de contrôler systématiquement le développement de l'enfant.

Ce qu'il importe de contrôler directement, c'est en effet le résultat plutôt que le moyen : l'appréciation de la valeur de l'instruction reçue ne peut-être

jugée que par la détermination du développement réalisé chez l'enfant, avant, pendant et après l'application d'un régime éducatif.

Une loi imposant l'instruction obligatoire, devrait donc imposer pour les enfants ayant atteint l'âge d'obligation, un contrôle destiné à déterminer leur développement et par conséquent, à préciser les conditions dans lesquelles devra se faire leur instruction. Ce contrôle devrait être renouvelé aussi souvent qu'il serait reconnu nécessaire pour apprécier la valeur de ces conditions, et spécialement à la fin de la période d'obligation, au moment où l'enfant aurait atteint l'âge, auquel il doit avoir acquis le minimum d'instruction reconnu indispensable pour réaliser son adaptation au milieu social.

Le bénéfice de ce contrôle devrait inévitablement s'étendre aux enfants qui n'ont pas encore atteint l'âge d'instruction. La constatation des anomalies et de leurs conséquences amènerait la recherche des causes qui les déterminent ; et, l'extension du contrôle ne tarderait pas à être reconnu nécessaire pour assurer le développement normal de l'enfant avant comme pendant le période d'instruction obligatoire.

Après avoir subi l'influence du milieu scolaire, l'enfant passe le plus souvent dans le milieu professionnel qui offre lui aussi des dangers croissants. La spécialisation hâtive, l'encombrement, déterminent souvent des conditions nuisibles à l'achèvement complet du développement de l'enfant. Aussi, tous les hygiénistes sont-ils d'accord pour réclamer le certificat d'aptitudes pour l'admission de l'enfant au travail et pour demander l'inspection régulière des travailleurs, spécialement de ceux qui exercent les professions les plus insalubres !

L'accroissement de la complexité du milieu physique n'est pas moins nuisible que l'accroissement de la complexité du milieu social. Dans les villes particulièrement le logement, comme l'école, comme l'atelier, ne réalise que très difficilement les conditions requises pour permettre à l'enfant d'évoluer normalement. Le milieu urbain devient, par son extension progressive, de plus en plus impropre, à satisfaire aux nécessités du développement d'un grand nombre d'enfants, qui ne peuvent que difficilement y trouver l'aliment, et surtout l'air et l'activité indispensables.

Le contrôle des enfants, soumis à des conditions aussi peu appropriées à leurs besoins, apparaît donc comme une nécessité absolue, si l'on veut à la fois assurer l'éducation de l'individu et entraver la dégénérescence de la race.

Le contrôle se fait déjà actuellement pour certaines catégories d'enfants et pour des périodes limitées du développement. Les nourrissons, les écoliers, les travailleus de certaines catégories professionnelles peuvent être, même parfois obligatoirement, soumis à un contrôle.

Mais l'insuffisance de l'organisation actuelle est évidente. Les enfants ne bénéficient d'un contrôle utile que tout à fait exceptionnellement ; les résultats au point de vue eugénique sont donc peu appréciables.

Nous croyons que, pour être efficace et pour favoriser réellement le perfectionnement de l'individu et l'amélioration de la race, le contrôle du développement devrait être généralisé à tous les enfants et prolongé pendant toute la durée du développement. Le contrôle comme l'instruction devrait être obligatoire; il devrait être également assuré par un organisme dont la fréquentation, comme celle de l'école, pourrait-être imposée à tous les enfants dont le développement ne serait pas soumis dans la famille à un contrôle effectif.

En attendant que la loi intervienne, l'initiative privée devrait poursuivre la realisation partout d'une institution, dont le but serait de systématiser l'action eugénique en assurant notamment le contrôle du développement de l'enfant.

Cette institution devrait être organisée dans toutes les communes; son action devrait, comme celle de l'école, être limitée à une population et à un territoire déterminés. Sa direction devrait être assurée par une sorte de comité engénique, comprenant les personnes qui, dans la commune ou la partie du commune sur laquelle devrait s'étendre l'influence de l'institution, sont amenées par leur profession à se préoccuper spécialement de l'enfant. Le contrôle devrait être confié à des médecins, comme on leur confie actuellement la constatation des naissances et des décès; mais une fois la naissance constatée et l'état civil établi, le médecin continuerait à exercer sur l'enfant un contrôle permanent, au cours des différentes phases de son développement. Le contrôle devrait être plus ou moins fréquent, suivant les dangers qui menaceraient l'enfant dans les milieux où il vit, et il devrait avoir pour but, non pas d'assurer directement une intervention éducative ou thérapeutique, mais de conseiller et d'apprécier l'intervention éducative ou thérapeutique des diverses institutions sociales, dont le but essentiel est l'éducation de l'enfant, la prophylaxie ou le traitement des maladies.

Dans les grandes agglomérations, les différentes institutions eugéniques locales pourraient être groupées, de façon à permettre la coordination et la systématisation du contrôle. Des relations devraient exister entre toutes les institutions communales, par l'intermédiaire d'un organisme provincial, qui lui-même pourrait-être sous la dépendance d'une institution nationale chargée de la direction du contrôle dans tous le pays.

Les institutions eugéniques ainsi comprises ne seraient en réalité que le développement des institutions chargées actuellement d'établir l'état civil des individus. Leur mission comporterait à l'avenir un contrôle plus direct et plus prolongé, dont l'obligation pourrait être imposée notamment pour les enfants qui réclament une protection spéciale tels que les orphelins, les enfants moralement abandonnés, les enfants martyrs, les enfants anormaux, etc.

En résumé, nous pensons que l'organisation pratique et continue de l'action eugénique par des institutions locales permettrait de réaliser l'éducation des particuliers et des pouvours publics en même temps qu'elle assurerait l'efficacité de l'application des lois relatives à la protection et à l'instruction de l'enfance.

Elle faciliterait la réunion des documents indispensables à la connaisance scientifique des faits d'hérédité et elle renseignerait d'une façon précise sur l'action réelle des diverses institutions sociales sur la transformation de la race.

THE PRACTICAL ORGANIZATION OF EUGENIC ACTION.

By DR. LOUIS QUERTON,

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The study of the physiology and hygiene of the reproduction of the human race has, for some years, demanded the special attention of numbers of scientists. The proofs of degeneracy, systematically received, have made us appreciate the practical importance of this study, which has, up to the present, been greatly neglected owing to customs and prejudices which caused the function of reproduction in human beings to be considered as presenting special characteristics, rendering the study of it, outside medical circles, difficult.

To-day we can approach, even before the general public, the examination of questions relative to the hygiene of reproduction, as we approach the examination of questions concerning the hygiene of nutrition or the hygiene of labour. The International Congress of Eugenics, following the Congress of genetics (Paris, 1911), and the Congress for the study of genealogy and heredity (Giessen, April, 1912), shows plainly the interest which the problem of the amelioration of the human race is actually arousing in all countries.

We can foresee now the moment when the struggle against degeneracy and for the amelioration of the race will be systematically organized.

We may ask ourselves how it would be possible to bring about the practical organization of eugenic action. The object of which should be at the same time (1) the study of causes which it would be possible to bring under social control, and which would be capable of improving or impairing the racial qualities of future generations; (2) the knowledge of the facts of heredity; and (3) the action of social institutions on the development of the race; in fine, the spread and application of the knowledge acquired.

The direct struggle against the hereditary transmission of abnormalities presents still great practical difficulties, but it is possible to combat to a certain extent the causes of the anomalies which unfold in the course of the development of the individual, and which depend on the conditions under which this development takes place. These conditions themselves depend on the physical and the social environment which, in consequence of their growing complexity, may create ever increasing obstacles to the normal evolution of the individual, while at the same time they compel him to acquire ever greater and more varied powers of accommodation. In order to combat the harmful effect of environment on the development of the individual, it seems that what matters the most is to organize the control of this development systematically.

It is not difficult to show that systematic observation of the child would enable us to prove in many cases the absolute or relative insufficiency of the reproductive fitness of the parents, resulting from the existence of disease, from a transmissible defect, or from ignorance of the conditions capable of altering, at any rate temporarily, the physiological equilibrium of the parents, and of leading to the production in the child of more or less important anomalies.

How many times does not the medical man assist without choice at the births of children, one after another fated to disease or degeneracy, most often as a result of syphilis, of alcoholism, or simply through the poor physical condition of the parents. How many times is the medical man consulted by young parents whose eugenic education is nil, and who are alarmed by the proofs of abnormalities appearing in the course of the development of their first child.

By a regular control of the development it would often be possible to ascertain the dangers of the hereditary transmission of diseases and defects, and it would often be possible to prevent the effects of these by putting a stop to new births when the production of degenerates is certain.

The organisation of the control would facilitate also the spread of the elementary ideas of eugenics, the knowledge of which would ensure to a certain extent the prevention of the avoidable consequences of a reproductive unfitness of the parents, either temporary or permanent.

It is not to be doubted that by making the methodical inspection of the child more general we could facilitate the determination of the measures to be taken in order to ensure in human society a relative "selection," and thus to approach the eugenic ideal anticipated by Galton.

The anomalies in the development of the child are often the consequence of the inadequacy of the educative fitness of the parents. And if it is true that it is still actually difficult to grasp the possibility of fighting systematically against degeneracy due to heredity, it seems as if the struggle

against the anomalies in development, due to the insufficiency of education, may be effectively pursued.

Already the diseases and deaths of children caused chiefly by errors in the feeding of the young have been considerably diminished, thanks to the methodically organized control of infants. For certain classes of infants the control has even been rendered obligatory.

Already, also, the control of school children, where it is seriously organized, has made it possible to guard in a large measure against the dangers of a scholastic régime unadapted to the needs of the child. Finally, certain classes of workers are subjected, sometimes compulsorily, to medical control. These interventions, however, remain limited to a very small number of individuals, and in most cases to part only of the period of their development. In order to guarantee to all children an appropriate educative environment in the family as well as in the school or in the workshop, it would appear quite indispensable to make the organization of this periodic control general.

This generalization is so much the more necessary because, in consequence of the progress of civilization, the complexity of the social environment is constantly increasing, at the same time as the conditions of the physical environment are being modified and rendered more complicated.

Greater difficulties for the development of the child and a greater risk of anomalies are the inevitable result.

It is evident that the social environment is becoming more and more complicated, and this progressive complexity is of a nature to render the development of the child more difficult.

In families, the necessities of modern life often separate the parents from the children, so that a great number of the latter benefit only in a very small degree by the gracious educative influence of a good family environment.

The infant has often to be placed out to nurse, or in a crèche, especially when the mother is bound to a trade which necessitates the partial or complete abandonment of breast feeding.

How many children for whom the family environment is non-existent—veritable orphans—pass successively to the crèche, the school and the workshop without having found in the family the stimulus appropriate to their needs?

Like the family environment the scholastic environment exposes the child to numerous dangers; abuses have become almost unavoidable in consequence of the constant growth of branches of knowledge, the acquisition of which is advantageous, but which leads to the overcrowding of the curriculum.

Now among the circumstances likely to favour the development of the child it is generally agreed to set in the first place the acquisition of a certain amount of education. The recognition by society of the right of the child to this is generally admitted, and the time is certainly not far distant when in every country this right to education will be established by law.

But all law remains ineffective without a rigorous control of its application.

We can convince ourselves of this by ascertaining precisely the results obtained in countries where education has been compulsory for some time, but where there exists no organization charged with the systematic control of the development of the child.

It is important to have, under direct control, the result rather than the means. The estimation of the value of the education received can be judged only by the proof of the development shown by the child, before, during and after the application of an educational régime.

A law imposing compulsory education ought therefore to impose on children who have reached the compulsory age an examination intended to determine their development, and in consequence to lay down precisely the conditions under which their education must be carried on.

This examination should be renewed as often as is found necessary for the estimation of the value of these conditions, and especially at the end of the compulsory period when the child will have attained the age at which he ought to have acquired the minimum of education recognized as indispensable to fit him for his social environment.

The advantage of this control should, without doubt, be extended to children who have not yet reached the age of compulsory education.

The proofs of abnormalities and their consequences should lead to enquiry into the causes which determine them, and the extension of the control would not be long in being recognized as necessary to ensure the normal development of the child before, as during, the period of compulsory education.

After being subjected to the influence of the scholastic environment, the child passes most often to the business environment, which also presents for him increasing dangers.

Premature choice of a trade, weighing him down, often leads to conditions harmful to the complete achievement of the development of the child.

So all hygienists are agreed in desiring a certificate of fitness for the admission of a child to work, and in demanding the regular inspection of workers, especially of those who are engaged in injurious occupations. The growth of the complexity of the physical environment is not less harmful than the growth of the complexity of the social environment.

In towns particularly the conditions of the dwelling-place, as well as of the school and of the workshop, are only with great difficulty brought up to the standard requisite to the normal evolution of the child.

The urban environment becomes by its progressive extension more and more unsuited to fulfil the conditions necessary for the complete development of a great number of children, who can only with difficulty find in it means of sustenance and above all the fresh air and exercise which are indispensable to them.

The control of children subject to conditions so little suited to their needs would appear to be an absolute necessity if we wish to ensure the education of the individual and at the same time to prevent the degeneration of the race.

This control is already an accomplished fact for certain classes of children and for limited periods of their development.

Infants, scholars, workers in certain trades may be, sometimes compulsorily, subjected to a control, but the inadequacy of the present organisation is evident.

It is only in very exceptional cases that children are really profitting by this advantageous control, and the results from a eugenic point of view are hardly appreciable.

We believe that to be efficient and to really favour the perfecting of the individual, and the amelioration of the race, the control of the development ought to be extended to all children and to be prolonged during the whole period of their development.

Control, like education, ought to be compulsory, it should also be ensured by an organisation, the attendance of which should, like that of school, be imposed on all children whose development would not be subjected to a proper control in the family.

While awaiting the intervention of the law, private enterprise should endeavour to obtain everywhere the establishment of an association whose aim should be to systematize eugenic action by ensuring to a certain degree the control of the development of the child.

This association should be organized in all townships. Its action should, like that of the school, be limited to one selected district and set of people. Its direction should be undertaken by a Eugenics Committee, including people who, in the township or part of the township over which the influence of the Association is to be extended, are led by their occupation to interest themselves specially in children.

The control should be relegated to medical men as the registration of births and deaths is relegated to them at the present time, but after the birth is registered, and the position of the child as regards the community established, the doctor should continue to exercise over the child, permanent control throughout the different phases of its development.

The control should be more or less frequent according to the dangers which threaten the child in the environment in which he lives, and it should have for its aim not to assure direct education or therapeutic intervention but to take advantage of the educative or therapeutic intervention of the various institutions whose essential aim is the education of the child and the prevention or treatment of disease.

The different local eugenic associations might be grouped into central bodies so as to permit of the co-ordination and systematization of the control.

All these town associations should be related by means of provincial or

county associations, which themselves should be under the guidance of a national association charged with the direction of the control of the whole country.

The eugenic associations thus included would be in reality only the development of the institution actually charged with establishing the civil status of the individual.

Their mission would bring with it in the future a more direct and prolonged control, the object of which would be especially to look after children who claim special protection, such as orphans, morally defective children, neglected or abnormal children. In fine, we believe that the practical and continued organization of eugenic action by local associations would act as a means of education for private individuals and public authorities, at the same time as it would ensure the efficacy of the application of the laws relating to the protection and education of childhood. It would facilitate the collection of documents indispensable to the scientific knowledge of the facts of heredity, and it would govern in a direct manner the actual operations which the various social institutions exercise on the development of the race.

MARRIAGE LAWS AND CUSTOMS.

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The subject matter of eugenics is offspring and offspring imply parents. For legal and other reasons society regards a knowledge of parentage as very important. Marriage is society's method of securing that knowledge. Incidentally the arrangement of marriage is of value for eugenical studies, in fact the principles of eugenics could hardly be established in its absence.

But society asks not only for a registry of matings but seeks to control, in some degree, the nature of the matings. On the one hand it seeks to protect monogamy and the young from the legal consequences of marriage. On the other hand, the nature of control measures, roughly, the result of society's experience that certain matings result in undesirable offspring. Let us, accordingly, examine some of these laws.

The most widespread marriage regulation of biological import in modern civilized states is that which limits the relationship of those whose mating may receive a legal sanction. In practically all of the States of the Union marriage of brother and sister, of parent and child, even of grandparent and grandchild is forbidden, and it is sometimes expressly stated that such marriages have no legal standing. In most States the marriage of

uncle and niece, or of aunt and nephew, are forbidden. When it comes to the mating of cousins, legislators have been in much greater doubt. About a third of the States forbid such marriages, and these are chiefly in the western, or more recently settled, territory. In most European States, I am informed, no legal limitation to the marriage of cousins exists.

Let us now consider in how far there is a biological justification for these laws. I know that there are those who hold that the mating even of brother and sister for generations may result in offspring without blemish. We are referred to the Incas of Peru, about whom we know little in detail, and to the Ptolomies, of whom we know a little more, but not as much as a well-trained field worker of the Eugenics Record Office would discover in two or three days. The last Cleopatra, the daughter of a brother and sister, is pointed out to us as the great argument against the evil effects of incestuous marriages. That she was the crowning flower of a beautiful race may be admitted, but is there any doubt that, were she living to-day, she would be placed in the manic-depressive ward of a hospital for the insane, with further history of paranoia and erotomania? But we, too, have histories of incest, brought in by our field workers; histories of families brought up, not in palaces, but in hovels in the woods. For example, a criminalistic man had, by an unknown woman, a number of boys and girls. One of the boys, who was a drunken, feeble-minded fellow with criminalistic tendencies, has had by his own sister a daughter who is a drunken epileptic. This daughter by her own father has had four children of whom one is epileptic, two are imbecile, and the fourth was an encephalic monster who died at birth. I would undertake to produce two cases of this general sort for each case that may be offered of the "romantic," "vivacious" product of a brother and sister mating. And can we doubt that a sober minded people have been impressed by such cases as I have cited, have stored them up in their memory as part of experience, and have crystallized that experience in laws against incest?

And how about the marriage of first cousins? Are the laws that forbid such marriages justifiable? Our modern knowledge of heredity leads to the conclusion that cousin marriages (like the marriage of sibs, possibly) is not injurious *per se*, but because such marriages enhance the probability that the same defect shall inhere in each of the two germ-cells that unite to start the development of the child. While the prohibition of cousin marriages is doubtless a rough eugenic measure, it were better if the prohibition were qualified somewhat as follows: "The marriage of cousins is forbidden when in the parental fraternity that is common to both, there is a case of inability to learn at school, of dementia precox or manic depressive insanity in any of their forms, of epilepsy, of congenital deafness, of albinism, or of cleft palate." Such a restriction in the application of the law might well increase the difficulty of administering it, but the law would be rendered more significant and less unjust.

A second consideration is whether any law against the marriage of cousins is enforceable. It may be argued from analogy that, just as laws against the marriage of sibs are pretty generally enforced, so may be that against cousins. But it is to be remembered that it is not the law, but early home instruction and the barriers erected at their home against sexual relations between children of a family that keeps down incest. The ever present danger of incest ensures adequate means to combat it, and these, together with a not uncommon repulsion between sibs, due to familiarity, are much more powerful than any law. But cousins usually live apart, the contempt of familiarity is not bred, and there is little precaution taken against the growth of friendliness and stronger attachments. Owing to these differences one cannot argue that a legal prohibition to cousin marriage as strong as that between sibs would result in cousin marriage becoming as rare as incest. Certainly, with the lack of social control that characterizes numerous and extensive areas of the United States, there would be no enforcement of a law prohibiting cousin marriage; or at least such a law would not prevent cousin matings. There are island communities in the United States where practically all marriages for two generations, at least, have been cousin marriages, and, probably in four-fifths of the cases, marriages of first cousins. There are other communities—largely occupying rural valleys—where probably not half of the more or less permanent matings are solemnized or legalized marriages, and such marriages as there are are chiefly between cousins. In fact, in any fairly stable, semi-rural community, where all matings tend soon to become consanguineous in some degree, it is going to be hard to enforce so delicate a distinction as that between the marriage of first cousins and of first cousins once removed. Love laughs at locksmiths and no less love laughs at legal limitations. I have suggested above that laws might be enacted forbidding cousin marriages under certain conditions. If they could not be enforced, of what use would they be? Their value would be primarily educational, and this value would be enhanced by a penalty for every enfringement of the law, such as more or less prolonged deprivation of some of the rights of citizenship. In time the reasonableness of the legislation would make a strong appeal.

The second legal limitation of a biological sort is that concerning the physical (including the mental) condition of those who contemplate marriage. Many States provide that if either party is an idiot or insane, the marriage is void, on the legal ground that such persons are incapable of making a valid contract. In not a few States paupers are permitted to marry only under restrictions, the limitation having an economic basis, namely that a male pauper cannot support a wife. In few, if any, of the States of the Union have the legislators or the people grasped the idea of restricting the marriage of the mentally or physically defective in order to diminish the

procreation of more defectives. Laws against the marriage of the feeble-minded are futile in any case. For so long as a feeble-minded person is at large he will find another feeble-minded person who will live with him and have children by him. It would be as sensible to hope to control by legislation the mating of rabbits. The only way to prevent the reproduction of the feeble-minded is to sterilize or segregate them. As to the marriage of the insane, it seems doubtful if it is wise to refuse this without qualification. Two mentally normal persons who have each an insane parent are more apt to have insane offspring than an insane person who marries one in whom there is no taint of insanity. I think it might be unwise to deny to every person who has shown a tendency to manic depressive insanity in its lighter forms marriage into mentally sound stock. Further study of this matter is needed. The requirement of a physician's certificate as to bodily soundness, which some clergymen are requiring in the States, is primarily directed toward venereal disease and certainly has eugenical bearings. When a requirement is made of a certificate that both parties come of mentally and physically satisfactory stock, a still more important step in eugenics will have been taken.

Finally, the third legal limitation of a biological sort is that concerning the mixture of races. Most of the States of the Union have laws declaring marriages void when contracted between a white person and a negro or the descendants of a negro for a certain number of generations, usually three; *i.e.*, "having one-eighth of negro blood." But the law of the State of Georgia prohibits for ever and declares null and void any marriage between a white person and one of "African descent." The Oregon law renders void any marriage of a white person with a person having one-fourth or more of negro, Chinese or Kanaka blood, or any person having more than one-half Indian blood.

The biological basis for such laws is doubtless an appreciation of the fact that negroes and the other races carry traits that do not go well with our social organization. For the Ethiopian has not undergone that selection that in Europe weeded out the traits that failed to recognize property rights, or that failed to give industry, ambition and sex control. The Southerner looks aghast at the possibility that these traits shall become disseminated throughout his social organization and become part and parcel of the make up of his descendants. So with the cruelty of the Indian. These fears are justified, but the cure is inadequate. Already the south is full of persons of one-eighth negro blood, whose (illegitimate) children may legally marry with whites. The Georgia law which denies marriage of white persons to descendants of blacks, however remote, is equally futile. Many a child arises in the third or later generations that by no test shows evidence of "African descent." How unjust the Missouri law that provides that the proportion of negro blood is to be determined by the jury from the appearance of the person! The south, indeed, has a problem in its huge

"feeble-minded" coloured population; but the problem is of the same order as that in the north and in England, and the solution is this: Forget unessentials, like skin colour, and focus attention on socially important defects. Then, by sterilization or segregation, prevent the reproduction of the socially inadequate. Thus will the mentally incompetent strains be eliminated and the good physical traits of some of the black races be added, as a valued heritage to enhance the physical manhood of the south.

I feel sure that if law will take lessons from biology many of the disasters that have been feared may be averted.

EUGÉNIQUE SÉLECTION ET DETERMINISME DES TARES.

Par Frédéric Houssay,

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L'Eugénique qui est une application sociale des sciences biologiques est une conception trop récente pour que l'on puisse la juger sur ses résultats; mais ses tendances sont assez nettement dégagées déjà pour qu'il soit loisible d'en faire une étude critique et de chercher comment elles se rattachent aux principes généralement admis.

En tant qu'elle préconise des règles pratiques et qu'elle cherche à empêcher la propagation de l'inapte par isolement ou stérilisation obligée ou volontaire, elle est une sélection artificielle. Cette technique, dont personne ne conteste l'utilité pour l'amélioration des races animales domestiques, doit assurément être envisagée comme efficace pour contribuer à l'amélioration de l'espèce humaine considérée dans son ensemble.

Dans ce dernier cas la seule question qui puisse être soulevée et prêter à discussion est celle du droit social d'intervention en pareille matière. L'intervention persuasive tout au moins ne saurait être tenue pour illégitime et ne pourrait être combattue que par une propagande contraire. Mais la persuasion serait sans doute bien peu agissante dans les cas de dégénérescence avancée accompagnée de misère incurable, dont aucune assistance ne peut faire sortir, et parfois d'un état ordinairement délictueux ou criminel.

En ces circonstances, la stérilisation par contrainte, si sa valeur de préservation sociale est suffisamment établie, n'est qu'un aspect particulier du droit de punir. Celui-ci, en effet, n'est ni une vengeance, ni un talion; sa légitimité repose uniquement sur le besoin primordial qu'ont les sociétés de se préserver et d'éteindre tous les foyers de contamination qui, en s'étendant et se généralisant, mettraient en péril la civilisation supérieure et la vie sociale elle-même.

Or ce droit de punir n'est combattu, au nom d'une logique abstraite oublieuse des réalités humaines et sociales, que par une minorité infime. Malgré les efforts de penseurs plus généreux que bien avisés, la plupart des Etats civilsés ont maintenu ce droit jusqu'à la peine de mort inclusivement ; certains ont remplacé celle-ci par une réclusion perpétuelle et complète qui semble bien un supplice pire que celui qu'il remplace.

Quoi qu'il en soit, dans l'un ou l'autre cas, par mort ou réclusion, le grand condamné est retranché du corps social et sa lignée éteinte du même coup.

L'extinction de la descendance par stérilisation est évidemment une peine moindre que les précédentes puisqu'au lieu d'être une suppression de la vie naturelle ou sociale, elle en est seulement une réduction morphologique et physiologique que l'on peut effectuer sans douleur. Il semble en conséquence qu'il soit légitime de l'étendre à de plus nombreux cas moins graves et moins brutalement menaçants pour la société.

Au reste, dans l'état actuel de la psychologie humaine, qu'il conviendrait de soigneusement entretenir, cette peine serait considérée comme plus infamante, plus humiliante que la mort sur l'échafaud théatral avec publicité, photographie et cinématographe. Elle serait par suite et à moins de frais un salutaire exemple et un épouvantail pour retenir ceux qui sont à la limite de la défectuosité et dont un effort psychique voulu seule peut empêcher la chute.

La sélection artificielle dont nous étudions ainsi la légitimité a priori peut d'ailleurs être justifiée d'une autre manière si l'on vient à penser qu'elle se produirait tout de même, un peu plus tard, sans aucune intervention sociale, par le fait seul que la descendance des tarés ou des dégénérés s'éteint spontanément, en peu de générations, par mort précoce des enfants ou par infécondité ordinaire. La sélection artificielle que l'Eugénique propose n'est donc qu'une avance sur une sélection naturelle en vue d'une économie sociale, résultat appréciable déjà par lui-même et en vue surtout de réduire les exemples fâcheux et les contagions morales qui proviennent de l'extension du groupe des incapables, artificiellement entretenu par l'assistance des meilleurs.

Sans qu'il soit besoin de développer davantage on voit que l'exposé précédent se rattache aux théories darwiniennes et il semble que, par la seule application des principes qui en découlent, le groupe des défectueux, *considéré à un moment donné*, puisse être rapidement éteint et que la société nettoyée puisse, pour une longue période, reprendre une vie allégée et plus saine.

Ce serait là une vue unilatérale qui laisserait échapper toute une face du problème et pas la moins importante ni la moins intéressante. Car, le groupe des défectueux, à mesure qu'il s'éteint à l'un de ses contours est, sur l'autre bord, perpétuellement renouvelé et grossi par de nouvelles recrues

résultant des dégénérescences peu à peu survenues dans les lignées d'êtres sains qui se dégradent.

Pour faire œuvre féconde, il ne s'agit donc pas uniquement d'accélérer artificiellement l'extinction d'un groupe qui surviendrait spontanément, il faut aussi, peut être même faut-il surtout, empêcher ce groupe de se reformer à mesure. Il faut tout au moins, si l'absolu en pareille matière est inaccessible, retarder tant qu'il se peut la vitesse avec la quelle le lot des êtres défectueux tend à se reconstituer.

Il importe essentiellement pour atteindre ce but d'être éclairé sur le déterminisme des tarés et de leur conservation par l'hérédité et, par cette préoccupation, on se rattache aux principes sur lesquels reposent les doctrines lamarckiennes. Beaucoup de données cliniques sont à utiliser dès maintenant, de plus nombreuses encore pourraient être recueillies.

On entrevoit déjà comme facteurs primordiaux : l'alcoolisme, la syphilis, et plus généralement toute intoxication spontanée ou résultant de maladies contagieuses, aussi bien que certaines diathèses parmi lesquelles l'arthritisme est à compter pour sa part. Tout ce qui tendra à restreindre l'action de ces facteurs est capital au point de vue qui nous intéresse.

Il peut sembler qu'à étendre ainsi le sujet, nous soyons au moment de sortir du cadre de l'Eugénique qui, telle que formulée jusqu'ici, fixe surtout son regard sur les dégénérés pauvres dont les incapacités diverses constituent des surcharges pour les sains et dont les impulsions facilement délictueuses ou criminelles sont des dangers sociaux. Mais les pertes sociales ne résultent pas seulement des charges inutiles d'assistance aux incapables ou d'entretien dans les prisons de trop nombreux délinquants.

Si, dans les classes aisées, la dégénérescence semble un malheur particulier, qui ne retentit pas sur l'ensemble social, parce que la fortune de famille permet d'y parer, n'est-ce point là une erreur? La régression intellectuelle et morale, quand elle survient dans la descendance de ceux qui se sont élevés jusqu'à l'élite, n'est-elle pas un mal social par le manque à gagner qu'elle représente, par la perte de grandes forces qui eussent pu s'employer?

A notre avis, les pertes sociales, pour ne pas s'exprimer par des phénomènes identiques, sont aussi importantes aux deux extrémités de l'échelle, dans l'extrême fortune et dans l'extrême misère et, pour la recherche du mieux, il convient de penser également à tous les cas. parce qu'aussi bien ils paraissent provenir des mêmes déterminismes physiologiques.

Mais que dire de la stérilisation par persuasion ou par contrainte s'il s'agit de l'appliquer aux dégénérés fortunés? Peut être seraient-ils en bien des cas susceptibles d'être persuadés plus facilement que les misérables. Au surplus, la restriction volontaire de la descendance, encore que suscitée par des considérations d'un tout autre ordre et surtout pour conserver et concentrer la richesse acquise, agit dans le sens eugénique, cela n'est pas

douteux, en ne multipliant pas les incapables qui en peu de temps laisseraient échapper la fortune, déjà réduite par division et deviendraient une surcharge sociale plus visible qu'autrement mais pas plus réelle.

Et quant à la stérilisation par contrainte dont nous avons dit qu'elle devait être envisagée et légitimée comme pénalité, les dégénérés riches y échapperaient comme déjà, par leur seule fortune, ils échappent à la plupart des pénalités qui atteignent leurs collègues pauvres. Il est bien sûr en effet qu'ils peuvent impunèment commettre les vols, les escroqueries que les infortunés paient de la prison parce qu'à propos une indemnité arrêtera les poursuites. De même encore, toutes les violences contre les personnes, qui n'iront pas jusqu'à l'assassinat, seront presque toujours réparées pécuniairement. Ces dégénérés esquiveront la pénalité de la stérilisation comme ils esquivent presque toutes les autres. Il serait désirable, hautement désirable, qu'ils pussent en être atteints mais, dans la réalité pratique, il est à craindre qu'il n'en soit pas ainsi.

L'inégalité qui se montre si l'on recherche l'extinction des dégénérés dans les deux cas extrêmes s'efface au contraire s'il s'agit de lutter, dans un cas ou dans l'autre, contre l'apparition de la tare, d'empêcher la production de son déterminisme connu, de lutter contre elle quand elle est peu invétérée encore et qu'on la reconnait.

La préoccupation sociale à laquelle cherche à répondre l'Eugénique serait par cette voie ramenée à des préoccupations hygiéniques et morales d'une efficacité autrement étendue et certaine que la pénalité.

En sorte que les divers principes biologiques que l'on oppose parfois entre eux et à la morale deviendraient convergents, trouveraient dans l'Eugénique une conciliation facile, une avantageuse collaboration et une subordination logique conforme à leur importance respective.

EUGENICS, SELECTION AND THE ORIGIN OF DEFECTS.

By FREDERIC HOUSSAY,

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Eugenics, or the social application of the science of biology, is too recent a conception to admit of being judged by its results; but its tendencies have emerged with sufficient clearness to permit of its critical study, and to enable us to enquire into its relation to principles generally allowed.

So far as it advocates practical rules, and seeks to prevent the propagation of the unfit by isolation or sterilization (whether voluntary or compulsory), it is an artificial selection. This method, whose utility no one

contests, for the improvement of the breed of domestic animals, ought assuredly to be taken into account as a valuable potential contributor to the improvement of the humankind considered as a whole.

In this latter case the only question which can be raised and discussed is that of the right of society to intervene in such a matter. Persuasive intervention at least could not be considered illegitimate, and could only be combated by contrary persuasion. But persuasion would doubtless be of little effect in cases of advanced degeneracy accompanied by incurable pauperism, which no assistance can remedy, and sometimes by a state of habitual profligacy or criminality.

In these circumstances enforced sterilization, if its value as a social preservative is sufficiently established, is only a special aspect of the right to punish. This, in fact, is neither in the nature of vengeance nor retaliation; its legitimacy rests entirely on the elemental need of society for self-preservation and for the extinction of focuses of contamination, whose extension and spread would imperil higher civilisation and even society itself.

Now, this right to punish is not combated in the name of an abstract logic, which forgets human and social realities, except by an insignificant minority. In spite of the efforts of thinkers, whose hearts are stronger than their heads, the majority of civilized states have maintained their right to punish inclusive of the penalty of death; some of them have replaced this by perpetual and complete seclusion, which seems a penalty worse than that which it replaces. But whichever way we choose, by death or seclusion, the condemned man is cut off from the social body and his lineage extinguished at a stroke.

The extinction of descendants by sterilization is evidently a penalty less than the preceding, since, in place of the suppression of natural or social life, we have here only a morphological and physiological limitation of it, which can be effected without pain. It seems, consequently, permissible to extend its use to more numerous cases of less severity and less clamorous menace to society.

Moreover, in the actual state of human psychology, which we must carefully cherish, this penalty would be considered as more degrading and humiliating than death on the public scaffold, with its accompaniments of photographer and cinematograph. It would be equally, and at less expense, a salutary example and a deterrent for the restraint of those who are on the border line of defectiveness, and in whose case a voluntary effort might prevent lapse.

Artificial selection, whose legitimacy we thus discuss in the abstract, can moreover be justified in another way, if one considers that it would come about all the same, a little later, without any social interference, by the simple fact that the offspring of defectives or degenerates undergo spontaneous extinction, in a few generations, by premature death of children or by ordinary infertility. Artificial selection, as suggested by Eugenics, is

only then an anticipation of natural selection with a view to social economy, in itself a valuable thing, and specially with a view to the reduction of evil examples and moral contagions which result from the enlargement of the group of unfit, artificially supported by the help of the fit.

Without developing the subject further, we see that the views here expressed fall into line with Darwinian theory, and it seems that by the simple application of the principles which follow from them, the group of defectives, *considered at a given moment*, could be rapidly extinguished, and that society thus cleansed could for a long period pursue a life of lessened burden and better health.

This, however, by itself would be a one-sided view which would leave out of account a whole aspect of the problem of the deepest interest and importance. For the group of defectives, while naturally extinguishing itself on the one side, yet in its other direction is perpetually renewed and extended by fresh recruits resulting from degeneration gradually introduced into the families of healthy persons.

In order that success may crown the work, we must not only hasten artificially the destruction of this group which would naturally ensue, but we must also—perhaps the most urgent of all—hinder this group from reforming itself at the same rate. At least we must, if in such a matter absolute success is unattainable, restrain as far as possible the speed with which the defective kind tend to recruit their ranks.

To this end, it is of the utmost importance to enlighten ourselves on the origin and perpetuation of defects by heredity; and with this object in mind we must cling to the principles on which rest the Lamarckian doctrines. Much clinical data is already available, and a still larger amount could be collected.

We recognise already as fundamental factors, alcoholism, syphilis, and more generally all intoxications which arise either spontaneously or as the result of contagious diseases, as well as certain diatheses, among which the arthritic diathesis must be counted. Everything which tends to restrain the action of these factors is of capital value from the point of view now under consideration.

It may seem that by covering so wide a field we should be overstepping the limits of Eugenics, which, by our former definition, fixes its outlook on the poor degenerates whose various incapabilities form a surcharge on the healthy, and whose naturally felonious or criminal propensities constitute a social danger. But the social losses do not result only from the useless cost of help to the incapable or the upkeep in prisons of the numerous delinquents.

If degeneracy among the well-to-do seems a private misfortune, though it does not recoil on the body politic as a whole, being prevented from doing so by the wealth of the family, does not this suggest an error in our theory? Is not intellectual and moral retrogression, when it overtakes the

descendants of those who have raised themselves to the highest social position—is not this a social evil by reason of the failure in progress which they represent, by reason of the loss of great potential forces?

In my opinion the social losses, though not expressible in identical terms, are of equal importance at the two extremities of the ladder—extreme wealth and extreme poverty—and in the quest for a remedy, we ought to keep in mind all cases equally, because they all appear to have the same natural origin.

But what can we say of voluntary or enforced sterilization if it is to be applied to wealthy degenerates? Perhaps they would often be easier to persuade into sterilization than paupers. For the rest, the voluntary restriction of families, brought about by considerations of quite another kind, and specially to conserve and concentrate their hoarded wealth—acts, no doubt, in a eugenic sense, in not multiplying the incapables who would in a short time scatter their wealth, already reduced by sub-division, and would become a surcharge on the public more palpable but not more real than before.

As for the enforced sterilization which we have said ought to be faced and legitimatised as a penalty, the rich degenerates would escape, as now, solely by reason of their wealth, they escape most of the penalties which fall upon their poorer brethren. These can now certainly commit thefts and swindles with impunity, for which the poor pay with imprisonment, just because an indemnity will stop the prosecution. In the same way, all personal violence, short of murder, can almost always be atoned by a money payment. These rich degenerates will slip out of the penalty of sterilization as they now slip out of all the others. It would be desirable, highly desirable, that they should come under the grip of such a law, but in actual reality there is reason to fear that they would not.

The inequality which thus comes to light when one seeks to extinguish degenerate stocks equally in the two extreme cases disappears if our motive is to struggle, whether in one case or the other, against the appearance of defect, to hinder the production of its known evolution, to struggle against it before it is inveterate and as soon as it is recognised.

The social problem which Eugenics seeks to unravel would, on this view, become solved on hygienic and moral lines more efficiently and extensively than by the proposed penalty alone.

In this way the various biological principles, which sometimes seem opposed to each other and to moral principles, would become convergent, and would find in Eugenics a ready reconciliation, a common field of useful labour, and a reasonable precedence suited to their respective importance.

PRACTICABLE EUGENICS IN EDUCATION.

By F. C. S. SCHILLER, M.A., D.Sc.,
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I may probably assume that at this Congress many voices will be uplifted to warn society in the name of science against the reckless way in which it is endangering the future of the human race. For the evidence is accumulating, and is already convincing to the more far-sighted, that the present ordering of all civilized societies, and particularly of our own, is promoting not the improvement of the human race, but its degeneration, and that at a very rapid rate. It also seems probable that the self-destructiveness of civilization is no new thing, but that we are only accelerating processes which have been operative more or less ever since the world grew to be civilized.

Theoretically this is a very interesting conclusion. For it explains so much about history. It explains why the human race does not improve, why man for man we do not seem to be any better than the ancients, nor even, in the eyes of impartial scientists, intrinsically superior to many savages. It explains why civilizations have in the past decayed, why throughout history the proud ruling races have died out, why the meek, the descendants of their slaves and subjects, the hewers of wood and drawers of water, have inherited the earth. In a variety of ways the ruling races have ruled themselves out, for a variety of reasons civilized societies die off at the top, and it is folly to imagine that so long as we repeat their errors we shall escape their fate. The complex machinery of civilized society does not run itself: it needs men to man it, and if a society is not capable of providing the men capable of controlling its machinery, it will only precipitate the ruin of the race. It is more essential than ever, therefore, that a modern society should put capable men at its head and enable them to rise to the control of things, while nothing is more ominous than that personal success should have so often to be purchased by racial extinction. A society in which this occurs habitually is organized so as to debase itself. True, the "proletariat" from below, after a fashion, still supplies the gaps at the top, and enters on the inheritance of the mighty men of old, and this, perhaps, is "social justice"; but it should not delude the average man into thinking that he is a superior being entitled to look down on essential achievements he could never rival. The inventor of the wheel or even of a new mode of chipping flints may well have been as great a genius as the human race has produced, and it accords well with this that the early palæolithic races seem to have possessed a cranial capacity, not less, but greater, than our own. For in the dim red dawn of man the fool-killing apparatus of nature was terribly effective, and society could do little to mitigate its horrors, and to protect its inefficient members.

Now the case is different, for social *contra-selection* offers manifold facilities for the survival of the unfit. It is theoretically interesting to see how this is done, but practically such contra-selection is dangerous, and not to be regarded with complete complacency, even though we see that it may be largely inevitable, and ethically salutary. But it is evident that even now there are limits to the power of a society to shield its members. It relieves the pressure on the individual largely by weakening the whole; and it is clearly impossible to keep a society collectively progressive, and even alive, if its members individually degenerate beyond a certain point. In spite of a growing control over nature, which better methods of transmitting knowledge render possible, there must come a point at which ancestral virtue and inherited capital can no longer ensure the survival of an effete race of fools and weaklings.

All existing societies, moreover, are probably much nearer this point than they usually suppose. For the great institutions, which have the social function of transmitting the treasures of accumulated knowledge from generation to generation, are always liable to get out of order, and to engender so much noxious rubbish as to clog their working and to poison humanity. Religions reduce to ritual, and become spiritually dead. States ossify into bureaucracies, which crush and sterilize all germs of progress. Worst of all, there is a standing danger that educators should become the worst foes to education. There is probably no system of education, and no university, in the world which does not tend to an over-production of pedantry and dogmatism, and which, if it were conducted wholly according to the ideas of the "experts" whose duty it is to run it, would not become worse than useless socially. For the experts, if left to themselves, tend to develop professional ideals and standards of value of their own, which grow independent of considerations of social welfare, and frequently run counter to them. But if there should occur at any time a general breakdown in the educational machinery which transmits the knowledge which is power and means social security, it is evident that a society may be propelled irreparably on the declivity that leads to its destruction. No society, therefore, is safe unless it is constantly on its guard against its own weaknesses, against the clogging of its institutions by their own waste products and by the excesses of their virtues, against the repression of ability and the preservation and promotion of unfitness, against the excessive delays in perceiving when old adjustments have broken down and new devices and new knowledge are needed to adapt human life to new conditions.

The social problem is so complex, and we are still so ignorant, that any extensive or radical scheme of eugenics, which presupposes, or even aims at, sudden and drastic changes in human nature, as all the utopias have hitherto done, is scientifically out of the question. It is more than enough to satisfy any reasonable ambition to counteract to some extent the prevalent tendencies to racial decay; and this is not only possible, but

vitally necessary. Such attempts, we have seen, must rely largely on a proper treatment of education: for it would be vain to provide the right men if they could not be rightly trained. I will try, therefore, to show how education can be made to help eugenics, believing that if we struggle manfully against some of the most popular, but unscientific, of educational nostrums, we may conserve and improve some eugenically valuable institutions, and implant in the young eugenical sentiments which in due course will bear fruit in better morals and more serviceable citizens.

No system of education has ever been perfect; but in our new-born zeal to educate every one, we have rather forgotten that the great failure of education has always lain in its dealings with the powerful and rich. Not even men of genius have succeeded in educating princes. Nero was no credit to the pedagogical skill of Seneca, nor Dionysius to Plato's, nor Christina to Descartes', while Aristotle and Alexander seem to have gone each his own way by mutual consent. Nor at the present day can it be said that Eton, though its King's Scholars are selected from the pick of British intellect, contributes in like proportion to our intellectual achievement. It may, therefore, be suggested that it is precisely because of the difficulty of educating them that the highest classes have failed to maintain themselves. It seems at first a paradox that it is precisely those for whom most is done, who achieve least, that those classes whom society endows with all the human heart desires and all that makes life worth living should find it most difficult to keep alive and should be in greatest danger of extinction. Satire has often noted that the sole merit of the *grand seigneurs* was merely *de se donner la peine de naître;* and nowadays even this appears to be becoming too much trouble for them—or for their parents. Yet a psychologist has no difficulty in resolving this paradox: it is precisely because these favourites of fortune already have what most desire, *and have to work for*, that they degenerate. To inherit wealth, rank, power and honour without effort of their own, deprives them of the ordinary objects of human ambition, and the chief motives to exertion. Even if they desired to lead a life of social service, democratic jealousy would distrust, and often baffle them. So they are driven into an idle life of frivolous amusement, succumb to its manifold temptations, and, often pleasantly enough, eliminate themselves. But should not those responsible for our social order reflect that if it is right to reward ability in one generation by wealth and power, it cannot be right to render wealth and power the instruments for destroying this same hereditary merit in the next? Should they not reflect upon the problem of equipping the young of the upper classes with an adequate motive to make the best of themselves physically, mentally and morally, to prevent them from succumbing to the extra moral strains of their position? To abolish inheritance would not do this. It would (1) diminish the output of valuable work which is now due to the desire to support one's family, and (2) it would diminish

further the output of children in the upper classes, the shortage in which is so perilous.

In dealing with the middle classes the educational problem is much simpler. They are the classes in which the social order stimulates and justifies ambition, in which the effort to rise has good prospects, and the rewards of ability and strenuousness are high. The youth of these classes, consequently, form the educator's best material, and the source of most of the efficient intelligence by which the work of life is carried on.

Nor can society be charged with not providing adequate careers for ability in the professions. Its failure here is of another sort. In all the professions (except, perhaps, that of the actress) the young are underpaid, and established reputations are overpaid. It would be eugenically preferable to do the opposite. Yet the existing practice is largely due to unintentional stupidity, and failure to discover ability soon enough. Now to the individual this system brings compensation, if he lives long enough, because he continues to be rewarded for work he has done long ago, and even is no longer capable of doing, and is eventually raised to the status of a "grand old man" whom ancient institutions delight to honour, by dint of sheer longevity. But eugenically this social *hysteresis*, this delay in recompensing merit, has a fatal effect. It renders the capable, ambitious and rising members of the professional classes unduly sterile, owing to compulsory celibacy, postponement of marriage, overwork, etc. Thus a large proportion of the ability which rises to the top of the social ladder lasts only for one generation, and does not permanently benefit the race. It is evident, moreover, that precisely in proportion as a society improves the opportunities of the able to rise, it must accelerate the elimination of fitness in the racial stock. So long as a relatively rigid social order rendered it almost impossible for ability to rise from the ranks, reservoirs of ability could accumulate unseen in the lower social strata, and burst forth in times of need, as in the French Revolution: but the more successfully a *carrière ouverte aux talents* is instituted, the more surely are these strata *kept drained*, and incapacitated from retrieving the waste of ability in the upper layers of society. Now it is doubtless true that the *primary* need of society is to find persons capable of conducting its affairs ably, and that a social order which does not allow ability to rise is therefore bad: but nations cannot with impunity so order themselves as to eliminate the very qualities they most admire and desire, and must husband their resources in men as in the other sources of their wealth and welfare. How then under the existing conditions can our resources best be conserved?

It should be observed in the first place that, without the least theoretical intention, the merely practical exigencies of education have in England gradually produced a system and a sentiment which to some extent counteract the mischiefs we have mentioned, and potentially, at least, may

have considerable eugenical value, a value which could be enormously increased by relatively slight modifications. This system is not deficient in psychological subtlety, and differs in certain important respects from anything that exists elsewhere.

It is remarkable for the comparatively slight emphasis it lays on intellectual education. It seems to have despaired altogether of utilizing for educational purposes the alleged desire for knowledge for its own sake, the universality of which Aristotle could assume as a truism in the Greek world. Not that it is utilitarian, and offers much that the youthful mind can recognize as useful knowledge. On the contrary the staple subjects of a " liberal " education seem so " useless " that it is thought that only the well-to-do can afford to study them; their real use is to serve as a caste-mark or class-distinction. But they evince their " liberality " in another way; they are *liberally endowed*. Care is taken that it shall pay a clever boy exceedingly well to study them.

It would, however, be erroneous to accuse the system on this account of a coarse commercialism: its commercialism is singularly subtle and attractive. For though prizes and scholarships are valuable, the hunt for them, which absorbs, trains, and sometimes strains, a boy's intellectual interests, is not a mere pursuit of gain. Such prizes are great *honours* as well as great prizes, and no one need disdain to win them. The powerful attraction of the system depends largely on the mixture of motives to which it appeals. It utilizes the desire to excel and the spirit of competition, it offers prospects of distinction almost as flattering to boyish vanity as the athletic system we shall examine later. It stimulates the teachers similarly: for scholarships won by their pupils redound to their honour and profit, and the competition for them ministers to their sporting instincts. So it is not too much to say that the intellectual efficiency of the English schools and colleges, which is far from despicable, rests essentially on what may be called for short the Scholarship System.

The Scholarship System, however, is only one branch of high-class English education, and probably the less important and effective half of it. The other half we may call the Athletic System. It is an admirably skilful use of the play-instinct and the desire for physical movement which are natural in adolescence, and turns them into instruments of a sort of moral education. Boys like to play games, and admire proficiency in them; *ergo* they shall all be made to play them and taught to enjoy that verbal paradox a " compulsory game," and shall get therefrom not only physical exercise but also moral training, and learn discipline and self-subordination. Nay more, there shall be based on athletic distinction a whole social order, and all shall learn to bow down before and reverence an aristocracy of skill and strength. Finally there shall thus be generated a love of bodily

exercise and a taste for outdoor life, which in after life will exact a certain "fitness" of body and soul and appreciably conduce to sanity and health. To conceive this ideal of "fitness," often dimly and crudely enough, is probably the most important thing the average boy learns at an English public school, and not remotely connected with the practical success of the Englishman in after life. It atones for many hours wasted on "gerund-grinding" pedantry in the teaching of the classics and on unpsychological unpracticality in the teaching of mathematics. Such, in barest outline, is the *rationale* of the Athletic Branch of English education, a system so subtle that not all the world's psychologists in solemn conclave assembled could have excogitated anything half so efficient.

For it is evident that the system as a whole makes a certain appeal also to the rich, and is productive of a certain measure of efficiency even in Eton and Harrow. A son of wealthy parents does not *need* a scholarship; but the hope of winning a distinction may incite him to work and to train his mind to his own benefit and that of the community. Or again his competitive instincts may be stimulated by the continuous series of examinations to which a thoroughly Darwinian scheme subjects him. More frequently, no doubt, the sons of the rich prefer to devote their energies to the Athletic Branch of the System, in which the rewards of excellence are quite as great or greater. The great Civil Service Examination, indeed, still selects into the Home and Indian Civil Service intellectuals whose minds are efficient in extorting marks from examiners who have not seen them; but the athletic ideal prevails in the Civil Service of Egypt, the Sudan, and the rest of the Empire. Professionally a "Blue" is a greater asset, and a much greater advertisement, than a "First" for a schoolmaster, a lawyer, a business man, or even a clergyman. No longer would a Dean of Christ Church follow Gaisford in advising ambitious youth to practise the writing of Greek verse as "an elegant accomplishment which not infrequently leads to posts of considerable emolument in the Church" or a Master of Balliol, Jowett, in valuing a First Class in *Literæ Humaniores* at £8,000. The "scholar" no longer meets the spiritual requirements of the age, and the "athlete" is quite as likely to "organize" his parish well, while he is manifestly fitter to teach boys what they really want to know. In short the system thoroughly suits the British character, and really works so well that we have quite forgotten how anomalous it is, and how queer it must seem to those who are not accustomed to it. Those who are, will realize that to abolish it is impossible, and to advocate its abolition a piece of quixotism no eugenist will waste his energy upon.

He will consider rather how this system may be improved and extended. And in the first place the Athletic Branch will need attention. It is evident that it already recognizes an ideal, the ideal of "fitness," which has great eugenic value. This ideal merely needs to be intellectualized and

spiritualized by including in the notion of fitness, all exercise of human faculty, even of brains. It ought not to be impossible to convince the British boy that he ought to aim at *all-round* "fitness," and that this includes skill in the use of brain as well as muscle, and the moral capacity of adjusting his action to the moral order of society and of improving that order; or otherwise, that there are common forms of "unfitness" which are intellectual and moral, and not merely physical. If the scope of the athletic spirit can be thus extended, it may not only arouse an intrinsic interest in intellectual education which is at present undeveloped, but may also mitigate the excessive stimulation of the competitive instincts by the Scholarship System.

That at present the Scholarship System is unhealthily competitive seems probable enough. It is not, as we saw, that it appeals solely, or even mainly, to the love of gain: there is enough honour mixed with the gain to make all desire to win scholarships as a manifest proof of ability, and enough gain mixed with the honour to silence the objection that scholarship-hunting, according to the recognized rules, is an unprofitable sport. As a rule the whole affair is conducted in a fine sportsmanlike spirit, both by the teachers and by the taught. The "best" scholarships are not necessarily the most profitable, but those which are traditionally regarded as the "blue-ribbon" competitions, for which all the best candidates are entered, and which consequently remain the best for this same reason. Nor are the intellectual racehorses, whom their teachers thus delight to train for the greater glory of the institutions with which they are connected and their own, overstrained or damaged; the system, though it frankly neglects the average mind, gets a great deal of work out of the superior intelligences and produces as a rule a well-trained efficient mind which can direct itself on anything. Nevertheless it produces a mental attitude which is not wholly salutary, precisely because it make such a strong appeal to the sporting spirit. It engenders a tendency to regard all knowledge as instrumental merely to a competitive game, and a willingness to tolerate and get up without reflection or criticism any sort of nonsense, provided only that it can be manifestly shown to pay for the purposes of some examination. It is evident that this temper is, both in itself anything but conducive to the accumulation of knowledge, and also that it is insufficiently resistent to the pedantry of examiners. For it measures the value of all subjects simply by its mark-getting efficacy in what is regarded as an essentialy useless pursuit, to which social convention has artificially added a commercial value. Probably intellectual education would yield better results, both as mental and as moral training, if the intrinsic usefulness (in the widest sense) of all knowledge might be hinted at, and if, from the premiss that the subjects of a "liberal education" are intrinsically "useless," the inference were not drawn that the more useless a study was made the better it was educationally.

What other reforms of the Scholarship System should we ask for? Would it, for example, be a real reform to restrict scholarships to the poor? This view is plausible, but fallacious. For (1) it would do nothing to improve the education of the rich, which we have seen to be the great social crux. On the contrary (2) it would *lower* the educational standards in several ways. It would diminish the inducements there are for the able among the rich to go in for intellectual exertion. It would diminish the social respect for intellectual achievement. For whereas at present the winners of intellectual distinctions are admitted to have won a certain distinction in a sportsmanlike fashion, it might come about that the acceptance of a scholarship would affix a certain social stigma, as tends to be the case in American universities. It would enhance the predominance of athleticism, which is probably already excessive. (3) Wealth is a relative term, and the practical difficulties of deciding when a father could afford to send his son to an expensive school or college without a scholarship would be considerable, and could not be solved without considering the total circumstances of the family. As it is, a father can sometimes pay for *one* son, but not (unaided) for two or three; but he is enabled to do so by the scholarships won by the first. But even if he could afford it, it does not follow that he would. The winning of scholarships has extensively come to be regarded both by parents, teachers, and the children themselves, as a sort of test of whether the minds of the latter are good enough to be worth cultivating by an expensive education. Schools and colleges, therefore, which confined their scholarships to the poor might find that they had cut off the source of the supply of most of their ability and diverted it into "business" or technical education, that they had deprived themselves of the chief stimulus to intellectual exertion, and had gained in return merely a not very valuable and despised class (for all those really brilliant are already enabled to win scholarships) of not very able minds, who could not be educated into anything but laborious dullards and whose artificial hoisting was a very dubious benefit to the community. (4) But eugenically the chief objection to this supposed "reform" is that it is devoid of the eugenical value of the existing system. As things are the system holds out to parents of good ability a reasonable probability that their children will, by their cleverness, win for themselves the means to the best and most expensive education. Hence, whether the parents themselves succeed in their profession or not, the future of the children is secured. So there will reasonably be less reluctance to produce them. It may well be that 15 or 20 years later the parents can well afford to pay for their education themselves. But it will then be too late to produce the children. If poverty, and not brains, is made the basis of selection, the competition will be so severe that the prospect of a scholarship will not enter into parental calculations: for, unfortunately, poverty and ambition are much

commoner than ability. Hence the Scholarship System, as it stands, acts as a distinct eugenical inducement, which, in these days, when the most valuable classes are bisected in every generation, is not to be despised: it could, moreover, be enormously extended and strengthened, and made into a pillar of "positive" eugenics.

The infusing of an eugenical spirit into the Athletic Branch of British education would so evidently be comparatively easy that it need not be enlarged on in great detail. The ideals of fitness and efficiency merely need to be broadened, so as to include moral and intellectual qualities and various forms of skill, instead of being restricted as now to expertness in two or three officially selected "games." The youthful mind is naturally prone to hero-worship, and could easily be taught to recognize this ideal of fitness. And what is more, its appeal would be universal, and, even if society did not honour it as it should and would, it would be its own reward. For no one could admire it, without striving to achieve it, nor attempt it without benefiting himself and improving the level of the race. Every one would feel that whatever his endowment, he could make himself fitter than he was and that it was worth while to do so in some direction in which his ability and bent indicated; he would not feel, as many boys do now, that they were not cut out for distinction in cricket and football, and conclude that they were utterly useless and give up trying.

Hence we should go some way towards solving the problem of supplying the highest classes with an ideal and a personal incentive to self-improvement. It is possible even that this ideal would appeal particularly to them: for they are not, on the whole, deficient in the qualities that would enable them to approach it, if they chose. If so, there might gradually arise out of them, and out of the eugenically best of the whole community, a new and real nobility, based on real superiority, and not as now recruited by the proceeds of unhallowed unions of wealth and politics, and this would absorb, or perhaps suppress, our present sham nobility, which has become a social institution that means nothing biologically. Such a real nobility would support itself on its intrinsic merits, and no doubt engender a *well-founded* pride of birth that would keep it both pure and prolific: for to have a large family would be approved of and admired only in the fit, and hence afford a more striking display of social ostentation than dresses or jewellery: and thus the spirit of Cornelia, the mother of the Gracchi, might return to earth.

And let it not be said that the eugenical ideal is anti-democratic: it is anti-egalitarian, but it will be anti-democratic only if the intrinsic inequalities of men are such that some must have all power and others none. But this there is much reason to doubt. On the other hand it is morally beneficial to every man to acknowledge superiority, and conducive to the stability of society; nor does this even hurt a man's self-esteem, if he can feel himself as superior in some respects as he is inferior in others. Thus

the aristocratic principle, in so far as eugenics sanctions it, is not wedded to any special form of government; it means only that we should not commit the folly, knowingly or unknowingly, of trying to eradicate the best. Finally, let me point out, that the infusion of a eugenical spirit into our educational methods, which I have sketched, does not interfere with any one's freedom, nor require any legislation; it is wholly an affair of transforming sentiment, and would mainly influence individuals by pervading the social atmosphere they breathe; if, subsequently, legislation came about, it would only register the conclusions of public opinion and experience.

For remainder of Papers completing Section II. and IIa. see Appendix.

Prof. A. Pinard, Member of the Paris Medical Academy.
"La puériculture avant la procréation."*

Dr. Alfred Ploëtz, President International Society for Race Hygiene, Germany.
"The Bearing of Neo-Malthusianism upon Race Hygiene."

Mr. Bleecker van Wagenen.
"Preliminary Report to the First International Eugenics Congress of the Committee of the Eugenics Section American Breeders' Association to Study and Report as to the Best Practical Means for cutting off the Defective Germ Plasm in the Human Population."

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* Owing to severe illness, we regret to announce that it has been impossible for M. le Dr. Pinard to complete his paper. To enable his views to be put before the readers of this volume, the abstract of the proposed paper is included.

Section III.

Sociology and Eugenics.

ELITE FISIO-PSICHICA ED ELITE ECONOMICA.

ACHILLE LORIA,

Il Professare del Economia Politica, Università di Torino.

Nessuno è più disposto di me ad elogiare e promuovere gli sforzi degli *eugenici* intesi a preparare una umanità più squisita e migliore; ma io credo che quest'opera non potrà compiersi colla dovuta efficacia, se prima non si definisce esattamente la sfera di individui, sulla quale si intende di agire.

Secondo io intendo le cose, si dovrebbero distribuire gli uomini a norma delle loro attitudini fisiche e mentali e dar opera perchè i matrimonj avvenissero esclusivamente fra gli individui meglio dotati fisicamente e moralmente, e perchè gli individui fisicamente e moralmente inferiiori venissero, per quanto è possibile, esclusi dalle nozze. Ma codesto disegno viene ad urtarsi contro le difficoltà pratiche più gravi; poichè non è facile graduare gli uomini a seconda delle loro attitudini. Passi ancora per ciò che riguarda le qualità fisiche, che si possono effettivamente assoggettare a valutazioni abbastanza soddisfacenti. Ma ben diversa procede la cosa per quanto riguarda le qualità mentali e morali, perchè un dinamometro dell'intelletto non è stato ancora scoperto. Si è di certo fatto qualche tentativo di approssimazione classificando gli scolari secondo i punti riportati agli esami; e così ha fatto Galton, osservando i punti di merito dei laureati all'Università di Cambridge. Ma questo metodo è molto fallibile e incerto, perchè molte volte i primi delle scuole appaiono nella vita dei perfetti imbecilli. Alcuni uomini si possono giudicare dalle loro opere—ma costoro sono sempre una tenue minoranza, e d'altronde il giudizio è molto difficile e incerto, perchè variabile colle inclinazioni e coi gusti del giudicante. E si noti poi che non tutti gli uomini lasciano produzioni letterarie e scientifiche, nè sempre i migliori. Poichè molti vi hanno pur dotati di un'intelligenza elettissima e che non ne lasciano sensibile traccia.

Di fronte a queste difficoltà così momentose deve sorgere naturalmente il pensiero di desumere le attitudini fisiche e mentali degli individui dalla loro posizione sociale ed economica, ossia dal loro reddito, il quale è invece perfettamente misurabile coi metodi meglio accessibili a tutti. Ed ecco pertanto che molti propongono di assumere l'*elite* economica come indice e prodotto dell'*elite* fisio-psichica. Se noi prendiamo una massa molto numerosa d'individui, e li distribuiamo secondo il loro reddito, ci troviamo dinnanzi ad una classificazione molto positiva, che potrà servirci di guida sicura ed agevole nel nostro compito di *eugenista.*

Assumendo infatti la posizione degli individui in questa classificazione come indice della loro posizione nella gerarchia delle attitudini, noi dovremo cercare di promuovere i matrimoni nei ceti più elevati e di avversare, per

quanto è possibile, i matrimoni fra gli individui dei ceti inferiori. E' importante notare come questa politca coincida in sostanza con quella raccomandata da Malthus, il quale pure voleva che gli individui delle classi superiori si sposassero e quelli delle inferiori no. E'vero che egli consigliava codesta pratica per impedire l'eccesso della popolazione sui mezzi di mantenerla, mentre gli eugenisti la raccomandano per impedire ai degeneri di propagarsi; ma in sostanza il risultato è lo stesso.

Ma tutto questo muove dal concetto che vi sia una analogia molto stretta fra l'*elite* economica e l'*elite* fisio-psichica, o che la prima possa effettivamente desumersi a criterio e sostitutivo dell'altra. Ora è ciò precisamente che io nego. La *elite* economica non è punto il prodotto del possesso di qualità superiori, ma è semplicemente il risultato della cieca lotta fra i redditi, che porta al fastigio quelli che posseggono inizialmente un reddito maggiore, per cagioni che possono essere assolutamente indipendenti dal possesso di superiori attitudini. E' una tesi che ho svolto ampiamente nella mia " sintesi economica " (trad. fr. Paris, Gyard & Brière, 1911) con una serie di dimostrazioni che qui non è possibile di riassumere. Mi limiterò dunque a riassumere brevemente il mio pensiero in proposito. Supponiamo pure, per una ipotesi di certo lontana dalla realtà, che tutti gli individui siano dotati di eguali attitudini fisio-psichiche, ma che, al principio del periodo di osservazione, siano ripartita in gruppi, forniti di un diverso reddito medio, il quale naturalmente non esclude qualche disparità dei singoli redditi individuali. Questa divergenza dei redditi medi dei vari gruppi, come dei redditi individuali in seno a ciascun gruppo, può benissimo esistere, anche supposte identiche le attitudini individuali perchè può derivare semplicemente dal possesso di una terra più fertile, o più generalmente di una azienda situata in condizioni fisiche meglio favorite. Ora fra questi individui, così forniti di redditi diversi, si scatena una accanita lotta economica, la quale si combatte coi metodi della violenza, della frode e del monopolio, ed ha per risultato la ascensione dei vincitori ad una sfera di reddito superiore e la precipitazione dei vinti in una sfera inferiore di reddito. Ebbene, siccome la intensità della lotta è in ragione diretta della entità del reddito, così essa sarà maggiore nelle sfere di reddito superiori, quindi, in queste sarà maggiore il numero dei redditieri precipitati. Perciò supponendo pure che all'origine del periodo d'osservazione i vari gruppi contenessero un egual numero di redditieri, ossia che la totalità dei redditieri di vario grado presentasse la figura di un quadrato, la lotta stessa fra i redditi finirà per generare una rarefazione progressiva nelle sfere dei redditieri superiori e quindi per trasformare il quadrato iniziale in una piramide. Ora coloro, che vengono a trovarsi al vertice di questa piramide, non vi si trovano già pel possesso di attitudini superiori, ma proprio unicamente pel cieco ingranaggio della lotta fra i redditi. Può darsi di certo che alcuni di essi siano anche forniti di attitudini mentali superiori,

ma può anche darsi che la loro grandissima maggioranza sia invece costituita di degenerati e non vi è nulla che assolutamente lo escluda.

La storia delle grandi fortune è del rseto là a dimostrare che il più delle volte i grandi patrimoni si creano, anzichè per opera di un genio sovrano, colle pratiche più vergognose ed inique.

La storia famiglia des Lazareff, in Russia, ha per capostipite uno schiavo indiano, custode del Tempio di Siva, il quale in una notte ruba uno dei diamanti colossali, formanti gli occhi del Dio, e con quello fugge nella Russia, ove vende la preziosa gemma a Caterina per un milione e mezzo di rubli. E il Myers nella sua opera recente sulle grandi fortune ha dimostrato come i patrimoni di Vanderbilt, Astor, Gould, e tutti i miliardari americani si siano formati per mezzo delle frodi e delle malversazioni più oscene. Che se pure i fondatori delle grandi fortune fossero per caso dotati di attitudini superiori, è sicuro che i loro discendenti ne saranno privi; perchè agira rispetto ad essi quella legge del *regresso alla mediocrita'*, che Galton ha così vittoriosamente stabilita. Dunque ad ogni momento dato, la superiorità economica non è per nulla un indice di attitudini fisio-psichiche superiori; sia perchè molti di quelli che ora conquistano quella posizione non la acquistano grazie al possesso di attitudini mentali più eccelse, sia perchè tutti gli altri, che hanno ereditate quelle posizioni da; precedenti conquistatori, sono privi assolutamente di attitudini cosiffatte. Dunque la superiorità economica non può in verun caso assumersi a misura e riflesso della superiotà fisio-psichica.

Ma noi possiamo avere una riprova sperimentale di questa conclusione, osservando la selezione conjugale, quale oggi si pratica, ed i suoi risultati. Ed in realtà oggi la selezione coniugale si pratica per l'appunto in conformità al criterio da noi combattuto, perchè, di regola, gli individui appartenenti ai ceti economici superiori si sposano esclusivamente fra loro. Ora se veramente gli individui appartenenti a questo ceto fossero i depositari privilegiati delle attitudini superiori, evidentemente la loro prole dovrebbe presentare in misura acuita queste attitudini, e perciò si dovrebbero constatare i più mirabili risultati. Ora invece si ha proprio il risultato-opposto, e sono appunto i matrimoni di ceto o di casta che danno i prodotti più desolanti. Il Fahlbeck nell'opera magistrale sulla "*Nobilta' Svedese*" ha dimostrato come i matrimoni di casta in essa prevalenti vi creano una degenerazione progressiva—la quale si manifesta dapprima col frequente celibato, la nuzialità sempre più attardata dei maschi, la forte e crescente proporzione di matrimoni sterili, la scarsa e decrescente fecondità (ora del (15.4 °/°°) inferiore sempre alla mortalità, la crescente figliolanza femminile, la crescente mortalità dei giovani inferiori ai 20 anni, la premorienza dei figli ai genitori, e che riesce ineccepibilmente a promuovere la estinzione della stripe. Da ciò la conseguenza che il 70% delle famiglie nobili originarie si è ormai estinto e che, nonostante le continue nobilitazioni di famiglie borghesi, il numero delle famiglie nobili non cresce,

o più spesso declina. Ed il Fahlbeck ha cura di soggiungere che tutto ciò si applica esattamente all'intero ceto facoltoso, di cui la nobiltà non è che un frammento.

Ma la stessa legge del regresso alla mediocrità, che si effettua con severità così inesorabile in seno ai ceti superiori, mi sembra essere un documento ulteriore della assoluta divaricazione della superiorità fisio-psichica dalla eminenza della posizione sociale. Prendiamo infatti parecchi individui, i quali tutti sono dotati di reddito superiore e perciò—secondo l'ipotesi che combattiamo—di qualità mentali superiori alla media. Se ora questi individui si sposano, i loro figli erediteranno in misura acuita le loro qualità superiori, e quindi conserveranno, se pure non eleveranno la media superiore della loro stripe, nè daranno luogo ad alcun fenomeno di regresso, tranne che rimpetto alle qualità eccezionali di un genitore straordinariamente dotato, dalle quali possiamo qui fare completamente astrazione. Dunque, se la selezione di casta fosse davvero una selezione eugenica, essa dovrebbe conservare nei discendenti la media superiore, non mai dar luogo ad alcuna discesa sotto di essa. Ebbene invece i matrimoni selezionati danno luogo non già soltanto ad un regresso di fronte alle qualità straordinarie di qualche progenitore geniale, ma proprio ad un reegresso di fronte alla media superiore, a una precipitazione nella mediocrità. Ora tutto ciò evidentemente non può comprendersi, non può spiegarsi, se non quando si comprenda alfine che i ceti economicamente superiori non sono per nulla dei ceti superiori psichicamente, e per ciò non son per nulla capaci a dare una prole superiore alla media indifferenziata. Se i matrimoni contenuti entro questi ceti dessero luogo a rampolli veramente scelti, si avrebbe in questo stesso fatto un indizio della superiorità mentale dei genitori. Ma se invece questi matrimoni dan luogo ad una prole degenere, parmi che un tal fatto getti per sè una luce assai sfavorevole sulle qualità dei progenitori o che distrugga la teoria che nelle elette economiche ravvisa delle elette del pensiero e della virtù.

Con ciò naturalmente non vogliamo autorizzare la conclusione opposta, che i ceti economicamente superiori siano sempre inferiori psichicamente e viceversa ; tesi che è smentita dalla più elementare esperienza. Affermando più modestamente la indipendenza assoluta fra la superiorità del reddito e la superiorità dell'intelletto, noi crediamo di attenerci scrupolosamente alla constatazione positiva della realtà, che di quella indipendenza porge la più luminosa riprova.

E questa conclusione ci sembra anche la sola, che possa ispirare una linea decisa e razionale di condotta al presente movimento eugenista. Infatti, se noi ammettiamo che la superiorità del reddito indichi per sè stessa una superiorità fisio-psichica, dobbiamo concludere che la selezione conjugale, quale oggi si avvera, nell'orbita del ceto, è già per sè stessa conforme ai precetti eugenici e esclude pertanto ogni propanganda pratica per effettuarla.

Vogliamo invece accogliere la tesi opposta secondo cui la eminenza fisio-psichica sarebbe esclusivamente raccolta nei ceti inferiori? Ebbene, in tal caso dovremo ancora appluadire alla selezione conjugale, quale oggi si pratica, la quale, accelerando l'estinzione dei ceti superiori, cancella dal teatro della vita gli individui degeneri e finisce per assicurare la sopravvivenza degli elementi popolari soli equilibrati e gagliardi.

Così qualunque teoria, la quale riconosca la esistenza di un rapporto, sia poi diretto od inverso, fra la superiorità fisio-psichica e la superiorità economica, conduce fatalmente ad un nichilismo eugenico, ed annulla ogni nostra pratica azione. Ma quando invece si riconosce (come è d'altronde, conforme a realtà) la indipendenza assoluta fra la superiorità fisio-psichica e la speriorità economica, si impone alla politica eugenica un preciso campo d'azione. E' necessario cioè di procedere ad un minuzioso e positivo esame dei caratteri individuali, che debbono essere constatati direttamente e non già desunti dal criterio fantastico della situazione economica—ed è poi necessario di dar opra, mercè provvide istituzioni economica—ed è compiano esclusivamente fra gli esseri fisio-psichicamente più eletti. Sarà questa, di certo, un'impresa difficile e richiedente un assiduo lavoro collettivo; ma persuadiamoci che solo questa fatica coscienziosa può addurci a risultati positivi e capaci di illuminare la nostra pratica azione.

THE PSYCHO-PHYSICAL ELITE AND THE ECONOMIC ELITE.

By Achille Loria,

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No one is more inclined than I am to praise and promote the efforts of the Eugenists to develop a better and more perfect humanity, but I am of opinion that this work cannot be accomplished with the necessary success unless the particular sphere in which it is intended to operate is first exactly defined.

As I understand the matter, it is expedient to distribute men according to their physical and mental capacities, and to encourage marriage exclusively amongst those who are best endowed physically and morally, and that individuals who are physically and morally inferior should be excluded from marriage as far as possible. But this plan encounters the gravest practical difficulties, since it is not easy to grade men according to their capacities. Let us ignore that which relates to physical qualities, which can be subjected to a fairly satisfactory valuation. Very different is the case as regards mental and moral qualities, since a dynamometer of intellect has not yet been discovered. It is true

some efforts have been made to classify scholars according to the results gained in their examinations, and Galton has worked on this plan, observing the distinctions of the graduates of the University of Cambridge. But this method is very fallible and uncertain, because often those first in the schools appear perfect imbeciles in life. Some men can be judged from their works—but these are always a small minority, and, besides, this method of judging is very difficult and uncertain, because it varies with the inclinations and tastes of the judge. And it must be noted that not all men, and these often the best, do not leave behind them literary and scientific productions. Hence, there are many men who, though endowed with a most choice intellect, do not leave any visible trace behind them.

In view of these formidable difficulties, the idea naturally arises of inferring the physical and mental aptitudes of individuals from their social or economic position, or from their income, which is easily estimated by methods accessible to all. And so many propose to assume that the economic élite may be regarded as the index and product of the psycho-physical élite. If we take a very numerous mass of men and arrange them according to their income, we find ourselves, it is affirmed, in face of a very positive classification which will be able to serve as a safe and easy guide in our task of Eugenics.

Assuming, in fact, that the position of individuals in this classification is an index of their position in the hierarchy of aptitudes, we should seek to promote marriages in the most elevated classes and to prevent, as far as possible, marriages of the inferior classes. It is important to note that this policy coincides in substance with that advised by Malthus, who wished that individuals of the superior classes should marry, and that those of the inferior classes should not marry. He, indeed, advised this course in order to prevent the excess of population over the means of subsistence, while the Eugenists recommend it in order to prevent the propagation of degenerates. But the result is substantially the same.

But all these proposals arise from the idea that there is a very strict analogy between the economic élite and the psycho-physical élite, and that the former can be correctly inferred and substituted for the other. Now, that is precisely what I deny. The economic élite is not at all the product of the possession of superior qualities, but is simply the result of the blind struggle of the incomes, which brings to the top those who originally possess a larger income through reasons which may be absolutely independent of the possession of superior capacity. This is a thesis which I have fully developed in my " Economic Sythesis " (Paris, Giard, and Brière, 1911) by a series of proofs which it is not possible to sum up here. I shall confine myself to briefly summing up the point of my thought. Let us suppose, by a hypothesis far removed from the facts, that all individuals are endowed with equal psycho-physical aptitudes, but that, at the beginning of the period of observation, they are divided into groups furnished with a different

average income, which naturally does not exclude some disparity amongst the individuals possessing that income. This divergence amongst the average incomes of the various groups, as of the individuals in each group, can easily exist, even assuming that their individual capacities were identical, since it can arise simply from the possession of more fertile land, or more generally from property situated in more favourable physical conditions. Now, amongst these individuals thus furnished with diverse incomes, there breaks forth a furious economic struggle, which is carried on with methods of violence, fraud, and monopoly, and has as its result the ascent of the conquerors to a sphere of superior income, and the descent of the conquered into a sphere of inferior income. So, as the intensity of the struggle is in direct relation to the amount of income, it will be greater in the spheres of superior incomes, hence in these spheres there will be the greater number of income-holders who will be cast down.

Therefore, supposing that at the beginning of the period of observation the various groups contained an equal number of income-holders, or that the entire number of the income-holders of various grades presented the figure of a square, the struggle amongst the income-holders would gradually bring about a progressive thinning of the spheres of the superior income-holders, and hence transform the original square into a pyramid. Now, those who come to find themselves at the summit of this pyramid do not find themselves there through the possession of superior capacity, but solely by the blind influence of the struggle amongst the income-holders. It may certainly be said it is possible that some of them are equipped with superior mental capacity, but it may also be possible that the large majority of them are composed of degenerates, and that no section of them excludes this class.

The history of great fortunes goes to show that most often great patrimonies are created, not so much by supreme genius, as by shameful and iniquitous practices.

The historical family of De Lazareff in Russia has for head of the race an Indian slave, a guardian in the temple of Siva, who one night steals one of the colossal diamonds forming the eyes of the god, and with this flies into Russia, where he sells the precious gem to Catherine for a million and a half roubles. And Myers, in his recent work upon great fortunes, has endeavoured to show how the property of American millionaires has frequently been obtained by means of frauds and the most odious defalcations. Besides, if the founders of great fortuntes should by chance be gifted with superior capacity, it is certain that their descendants should be wanting in these, because with regard to them that law of "return to the mean," which Galton has successfully established, would apply. Thus, at any given moment, economic superiority is by no means an index of superior psycho-physical aptitudes, whether because many of those who now possess that position do not acquire it by virtue of the possession of elevated mental

capacity, or because all the others who have inherited these positions from preceding possessors are completely devoid of such aptitudes. Thus, economic superiority cannot in any case be assumed to be the measure or reflection of psycho-physical superiority.

But we can have an experimental proof of this conclusion, observing conjugal selection, as it is practised to-day, and its results. And, in fact, conjugal selection at the present day is carried on precisely according to the principle which we contest, because, regularly, individuals belonging to the upper economic classes marry exclusively amongst themselves. Now, if individuals belonging to this class were truly the privileged depositories of superior aptitudes, clearly their offspring ought to show these aptitudes in marked degree, and, therefore, should present the most wonderful results. Now, on the contrary, the very opposite takes place, and it is exactly marriages of class and caste which furnish the most deplorable results. Fahlbeck, in his authoritative work upon "Swedish Nobility," has shown how caste marriages prevailing amongst them produce a progressive degeneration, which manifests itself by frequent celibacy, much delayed marriage of the male sex, the large and increasing proportion of sterile marriages, the small and decreasing fecundity (now 15.4 per cent.) always less than the death-rate, the increasing number of female births, the increasing mortality of youths under 20 years of age, the deaths of the children before that of the parents, which gradually tends to cause the extinction of the stock. As a consequence of that, 70 per cent. of the original noble families are now extinct, and notwithstanding the continual ennobling of bourgeois families, the number of noble families does not increase or very often decline. And Fahlbeck takes care to add that all this applies precisely to the whole wealthy class, of which the nobility is only a fragment.

But the same law of "return to the mean" which operates so inexorably in the circle of the upper classes, seems to me to be an ultimate proof of the absolute separation of psycho-physical superiority and eminence in the social scale. Let us take some individuals who are all possessed of a superior income, and therefore—according to the hypothesis which we dispute—of a mental quality above the average. If, now, these individuals marry, their children will inherit in marked degree their superior qualities, and hence will preserve, if not raise, the superior average of their stock, nor give cause for any phenomenon of regression, exception being made of the exceptional qualities of an extraordinarily gifted progenitor, which we can here completely ignore. Thus, if the caste selection were really a eugenic selection, it ought to preserve the inferior average in the descendants and never give occasion for descent from it. But, on the contrary, these selected marriages give rise not only to a regression from the extraordinary qualities of some progenitor of the family, but precisely to a regression from the superior average to a fall into mediocrity.

Now, all this clearly cannot be understood or explained unless it is understood that the economically superior classes are not psychically superior classes, and on that account capable of producing a progeny superior to an indifferent average. If marriages included in this class gave origin to truly select off-shoots, there would be in this fact an indication of the mental superiority of the progenitors. But if, on the contrary, these marriages gave origin to a degenerate offspring, it seems to me that such a fact throws a sufficiently unfavourable light upon the qualities of the progenitors, and that it destroys the theories that the economic élite are identical with the élite of thought and virtue.

With all this, naturally we do not wish to assert the opposite conclusion—that the economically superior classes are always inferior psychically and vice versâ—a position which is disproved by the most elementary experience. More modestly affirming the absolute independence between the superiority of income and the superiority of intellect, we believe that we scrupulously attain to the proof from actual fact, which affords the clearest evidence of this independence.

And this conclusion seems to us the only one which can inspire a decisive and rational line of conduct to the existing Eugenic movement. In fact, if we admit that a superiority of income indicates by itself a psycho-physical superiority, we must conclude that the conjugal selection which takes place to-day in the circle of class is at present conformable to eugenic principles and altogether excludes any practical propaganda to effect it. Do we desire, on the contrary, to accept the opposite affirmation, according to which psycho-physical eminence would be exclusively met with in the inferior classes? Well, then, in such a case we should be obliged to applaud the conjugal selection which is practised to-day, which, accelerating the extinction of the superior classes, removes from the theatre of life degenerate individuals and finally secures the survival of well-balanced and vigorous popular elements.

Thus any theory which recognises the existence of a relation, direct or indirect, between psycho-physical superiority and economic superiority leads fatally to a eugenic nihilism and destroys all practical action. But, on the contrary, when one recognises (what is, besides, consistent with the facts) the absolute independence of psycho-physical and economical superiority, a precise field of action is open to eugenic policy. It is requisite to proceed to a minute and positive examination of individual characters, which must be directly ascertained and not inferred from the fantastic criterion of their economic position, and it is necessary to take care, by means of wise institutions, so that marriages may take place exclusively amongst the most select class, physically and mentally. This will certainly be a difficult task, and one demanding assiduous collective labour; and we are convinced that only this conscientious effort can lead to positive results, and such as will throw light upon our practical action.

LA CAUSE DE L'INFÉRIORITE DES CHARACTÈRES PSYCHO-PHYSIOLOGIQUES DES CLASSES INFÉRIEURS.

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Si l'on classe les hommes qui forment la société, d'après leurs revenus (et il est relativement facile de faire ce classement, soit d'après les données statistiques, soit d'après des recherches individuelles) on forme des groupes, ou des *classes économiques*, assez différentes les unes des autres, qu'on peut comparer entre elles. Aux deux extrémités de la série des groupes ainsi formés, on aura d'un côté les groupes formant les *classes aisées*, et de l'autre les groupes formant les *classes pauvres*.

De même, on peut classer les arrondissements d'une ville d'après leurs indices économiques et sociaux, ainsi que: prix moyen du loyer dans chaque arrondissement; nombre des ouvriers et des patrons; nombre des domestiques; nombre d'illettrés, etc. On forme alors deux groupes d'habitants: les habitants des quartiers riches (*classes supérieures*, *classes aisées*) et les habitants des quartiers pauvres (*classes pauvres*, *classes inférieures*).

Enfin, si nous groupons les hommes formant la société, selon leur catégorie professionnelle, on formera des *groupes professionnels*, très différents les uns des autres, des groupes qu'on pourra comparer entre eux, et dont quelques uns représentent, d'une façon caractéristique, l'aisance et la position sociale élevée, tandis que d'autres représentent la misére, la pauvreté et les positions sociales moins élevées.

Après avoir formé ces groupements nous pourrons comparer les caractères des hommes des classes pauvres aux caractères des hommes des classes aisées,—et les caractères des hommes des classes inférieures à ceux des hommes des classes supérieures.

Or, dans une série de recherches et de travaux personnels,—très modestes mais persévérants—je me suis précisément efforcé de comparer entre eux les groupes économiques, sociaux et professionnels si différents les uns des autres; et je crois qu'on peut ainsi démontrer quelle est l'importance des différences *physiques* et *mentales* qui séparent entre eux les hommes appartenant aux différentes classes sociales, économiques et autres.

Supposons, à titre d'exemple, d'avoir à comparer entre eux deux groupes d'hommes, différents l'un de l'autre par le fait d'appartenir à deux classes professionnelles ou économiques diverses: tels que des *paysans* et des *étudiants*,—ou bien des *sujets aisés* et des *sujets pauvres*. Je me suis proposé de déterminer, pour chacun des deux groupes à comparer,—d'abord les *caractéres physiques* et *physiologiques* (ainsi que la taille, le poids, la circonférence du thorax, la force mesurée au

dynamo-métre, la capacité du crâne, sans oublier les autres caractères craniens, l'époque de la puberté, la rapidité de la croissance, etc. Ensuite j'ai taché de mesurer, dans les deux groupes à comparer, les *caractères psychophysiologiques* traduisibles en chiffres, tels que les différentes sortes de la sensibilité (qu'on peut explorer à l'aide des instruments de précision de la psychologie expérimentale) et les différentes formes de fonctionnement de la mentalité, qu'on peut mettre en évidence à l'aide des *mental-tests*.

J'ai procédé, en troisième lieu, à la mensuration des *caractères démographiques* caractérisant chaque groupe, tels que la natalité, la mortalité, la masculinité, la morbidité, l'âge du mariage, l'attraction des semblables, la mobilité à travers le territoire, etc.

Il me restait, enfin, à préciser les *causes* qui déterminent,—chez des groupes si différents au point de vue de la profession ou de l'aisance,—la formation ou la persistance des caractères constatés.*

Avant de résumer les résultats obtenus, qu'il me soit permis de dire encore quelques mots à propos de la méthode.

En présence de la masse héterogène de la population, formée par des milliers de molécules les unes différentes des autres, nous pouvons d'abord grouper entre elles celles qui se ressemblent au point de vue de l'aisance, et nous pouvons, par conséquent, former des *groupes d'aisés* et de *pauvres*: ainsi dans les écoles élémentaires et secondaires de la Ville de Lausanne j'ai choisi des groupes d'enfants aisés, et des groupes d'enfants pauvres, en me servant,—pour ce classement—des informations puisées chez l'instituteur. ou de l'indice fourni par la profession du père de l'enfant. On peut aussi comparer entre eux les enfants d'une école publique située dans un arrondissement pauvre de la ville, avec les enfants d'une école privée fréquentée par des sujets appartenant aux classes économiques plus élevées. Après avoir, pour ainsi dire, ordonné d'une telle façon la trame de la population, nous pouvons la décomposer, pour la recomposer ensuite suivant un dessin nouveau; c'est à dire suivant la *profession*: les nombreuses recrues de l'armée italienne, par exemple, classées selon la profession, nous ont permis l'étude des caractères physiques et autres, notés sur la fiche anthropométrique du conscrit et groupés selon la profession.

Enfin, nous pouvous encore une fois décomposer la toile que nous avons tissée, pour construire, avec les mêmes éléments fournis par la population,

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* Nous nous permettons de renvoyer le lecteur à nos travaux sur ce sujet: *Les Classes Pauvres*, un vol. Paris, Giard et Brière editeurs, 1905;—*Forza e Ricchezza*, un vol. Torino, Bocca editore; et Barcellona, Henrich editore, 1906;—*Ricerche sui Contadini*, un vol. Sandron editore, Milano—Palermo 1907;—*Anthropologie der Nichtbesitzenden Klassen*, un vol. Maas und Suchtelen editeurs, Leipzig und Amsterdam, 1910;—*Antropologia delle classi povere*, Milano 1910, Vallardi editore,—et les mémoires: *Contribution à l'étude des corrélations entre le bien-être économique et quelques faits de la vie démographique, etc*, in Journal de la Société de Statistique de Paris, Août 1911,—et *A propos de quelques comparaisons entres les mensurations obtenues sur les sujets appartenant à des classes sociales différentes*, in *Bull. de la Société d'Anthropologie de Paris*, 1911, etc.

une broderie nouvelle, car, après avoir assemblé les hommes suivant leur *aisance*, et les avoir ensuite groupés selon leur *profession*, je peux les grouper suivant qu'ils habitent les zones riches ou les zones pauvres du même pays, ou, encore mieux, suivant qu'ils habitent *les arrondissements riches* ou les arrondissements *pauvres* de la même ville. Grâce à ces méthodes, et à d'autres encore que je passe sous silence, nous pouvons composer,—à l'aide des innombrables mosaïques humaines dont la population est formée,—des dessins qui mettent face à face des groupes économiques, sociaux, professionnels et territoriaux tout à fait différents les uns des autres. Sur ces groupes, ainsi composés, nous pouvons nous efforcer d'étudier les caractères qui sont spéciaux à chacun d'eux. C'est précisément la méthode que nous avons suivie dans nos travaux.

Quels sont les résultats de cette exploration physique, mentale et démographique à travers des groupes si différents les uns des autres?

Nous devons dire, d'abord, qu'on peut utiliser un matériel, assez abondant, d'observations faites par plusieurs auteurs, dans des différents lieux et à des époques différentes, quoique plusieurs fois dans un but bien divers de celui qui nous occupe; je rappelle, au hasard, les données anthropométriques des conscrits espagnols, français, saxons, classés selon leur profession; je rappelle les chiffres de la sensibilité, obtenus dans les recherches de psychologie expérimentale en comparant entre eux des sujets normaux (étudiants ou ouvriers) et des sujets anormaux (tels que les aliénés, les criminels, les arriérés, etc.); je rappelle aussi les très nombreuses données recueillies un peu partout sur la natalité, la mortalité et les autres faits de la vie démographique en fonction de la profession, du degré d'aisance, de la zone territoriale, etc. Mais pour utiliser ces données il faut trier tout ce matériel en écartant toute observation (et il faut bien dire qu'il s'agit d'une grande quantité de données) qui ne répond pas aux préceptes de la méthodologie statistique (homogénéité, insuffisance du nombre d'observations, matériel non comparable, et ainsi de suite). Ensuite il faut élaborer le matériel utilisable avec une méthode plus précise que celle dont on s'était servi; je veux dire qu'il faut s'efforcer d'introduire dans l'élaboration ces formes d'analyse statistique assez récentes qui ont donné à la méthodologie un essort nouveau.

Le premier chapitre de nos recherches est donc un chapitre d'histoire critique et de reconstruction.

Le deuxième chapitre, au contraire, est formé par les recherches personnelles suivantes. J'ai pris les mensurations anthropométriques d'environ 4,000 enfants des deux sexes appartenant aux écoles primaires et secondaires de la Ville de Lausanne et classifiés selon leur dégré d'aisance; j'ai comparé ensuite entre eux, au point de vue du développement physique et de la sensibilité examinée à l'aide de l'esthésiometre de Brown-Séquard, des groupes d'ouvriers et des groupes de mes étudiants de la faculté de Droit;—j'ai étudié, en outre, un à un, cent crânes tirés de l'ossuaire d'une

des communes rurales le plus pauvres de l'Italie du Sud (afin de faire l'anthropométrie et la morphologie sur le crâne sec, d'un groupe professionnel très pauvre)—et enfin j'ai mis en corrélation, en me servant des coefficients de corrélation bien connus—les indices du bien-être économique, dans les différents arrondissements de la Ville de Lausanne, avec les taux de la mortalité, des causes de décès, etc., pour les mêmes arrondissements.

Je passe en silence beaucoup d'autres sondages dans cette sorte d'océan si etendu et si suggestif, car j'ai hâte d'arriver aux conclusions.

Je crois ne pas me tromper en affirmant que *les individus des classes inférieures présentent, en comparaison des sujets des classes supérieures un moindre développement de la taille, de la circonférenece cranienne, de la sensibilité, de la resistance à la fatigue mentale, un retard dans l'époque où la puberté se manifeste, un ralentissement dans la croissance, un nombre plus grand d'anomalies et d'arrêts de développement;* bref, une très grande quantité d'indices, qu'on peut exprimer avec toute la rigueur des chiffres, accusant *un organisme qui se place,*—dans une courbe binomiale où seraient échelonnées les différentes valeurs humaines, *vers les valeurs les plus basses.*

Les groupes formés par ces mêmes individus appartenant aux classes inferieures présentent, en outre, des *caractères démographiques* bien connus par les statisticiens: les classes inférieures présentent une plus *grande mortalité et une plus grande natalité; la fréquence de certains causes de décès; la moindre mobilité à travers le territoire; la précocité dans l'âge du mariage; la prédilection pour certaines formes de criminalité, etc.*

Mais il me semble nécessaire d'attirer l'attention du lecteur sur ce fait: sur la grande importance qu'ont, selon nous, en démographie les caractères physiques et mentaux des hommes. Ces derniers caractères sont intimement liés aux caractères démographiques, car je pense que *ce sont les caractères physiques et mentaux des hommes* (mesurables en chiffres et constituant par là le premier chapitre de la démographie) *qui contribuent sensiblement à réunir les hommes en groupes de semblables; à les pousser vers des groupes professionnels determinés; à les faire monter ou descendre le long des marches de l'échelle sociale, et par là à créer la vie démographique spéciale à chaque groupe.*

Dans d'autres termes, je pense que si nous classons les hommes formant la population, d'après leurs caractères physiques et mentaux, nous obtenons une sorte de représentation graphique, dont toute autre représentation graphique figurant les hommes classés d'après leurs caractères sociaux, économiques et démographiques, n'est que la dérivation et la déformation.

Voici, maintenant, la question qui se pose: Quelles sont les causes qui produisent chez les hommes des groupes sociaux inférieurs, les caractères que nous avons indiqués?

Il est hors de doute que les *conditions mésologiques* dans lesquelles ces hommes vivent constituent l'une des raisons de la détérioration et de l'infériorité de leurs caractères physiques, mentaux et autres. Mais il existe

aussi une autre catégorie de causes, très importante : ce sont les *caractères individuels* que chaque homme porte avec lui en naissant et qui constituent le patrimoine physique et mental de l'individu, patrimoine qui l'accompagne pendant toute sa vie.—*Grâce au simple jeu de la variabilité biologique chaque homme nait différent de tout autre homme ;* et, par là, chaque exemplaire humain prend sa place spéciale dans la courbe binomiale des caractères et des aptitudes des individus.

Les hommes qui naissent avec des caractères physiologiques et mentaux d'ordre inférieur tendent à sombrer dans les classes inférieurs ou tendent à rester en bas s'ils y sont nés. Vice versa *les hommes qui naissent porteurs de caractères supérieurs, tendent à monter en haut, ou à rester dans les hautes positions économiques, sociales, intellectuelles, qu'ils ont déjà conquis.*

C'est, donc, grâce à cette sélection continuelle, et à ce passage—plus ou moins interrompu, et plus ou moins complet—des molécules sociales à travers les groupes et les échelons de la société, que nos examens et nos chiffres trouvent les caractères individuels d'infériorité dans les classes inférieures de la société et les caractères opposés dans les classes supérieures.

Faisons maintenant une deuxième approximation. Je n'ai parlé, jusqu'à présent, que de *moyennes*. La moyenne, par exemple, de tous les chiffres indiquant la sensibilité (mesurée à l'esthésiomètre) dans un groupe d'enfants pauvres indique une sensibilité moindre que celle présentée par la moyenne obtenue sur un groupe d'enfants aisés. Mais, si au lieu de comparer les deux moyennes, je compare entre elles les deux *courbes* tout entières dont résulte chaque moyenne, j'arrive à découvrir un fait qui est, selon moi, de la plus grande importance.

En superposant, en effet, la courbe de la sensibilité des pauvres à celle des enfants aisés, je trouve—il est vrai—que la classe la plus fréquente (et qui coincide avec la moyenne) indique une sensibilité plus haute pour les sujets aisés ;—mais je trouve aussi *qu'il existe parmi les sujets pauvres une certaine quantité d'individus à sensibilité supérieure ;—et parmi les sujets aisés une certaine quantité de sujets à sensibilité inférieure.* L'analyse des chiffres en série met par conséquent en relief des faits que la moyenne nous avait cachés. Et ce qui est vrai pour la sensibilité, l'est aussi pour les autres caractéres.

Voilà, donc, que l'on peut démontrer l'existence d'un petit groupe de "supérieurs" dans les classes inférieures et d'un petit groupe "d'inférieurs" dans les classes supérieures.

N'est-ce-pas entre les individus formant ces deux groupes *d'exception* que se font les *échanges sociaux* permettant aux meilleurs et aux plus habiles d'en bas de monter en haut, et forçant les dégénérés d'en haut à tomber en bas ?

L'analyse des groupes humains ainsi conduite élargit—si je ne me trompe—l'horizon d'un des chapitres les plus vivants et les plus palpitants de l'anthropologie. Elle crée une branche nouvelle de l'anthropologie, qu'on pourrait appeler : *Anthropologie des classes pauvres*, ou *Anthropologie des classes sociales*, qui étudie les caractères physiques et mentaux des hommes,—et qui, de l'autre côté, étudie de quelle façon ou peut faciliter la *circulation* des molécules sociales. Tout en mettant en évidence l'infériorité physique et mentale des classes inférieurs elle trouve cependant l'existence d'une certaine quantité *d'inférieurs* dans les classes supérieures et de *supérieurs* dans les classes inférieures.

Parmi les chapitres de l'Eugenique—qui se propose l'étude de l'amélioration physique et mentale de la race,—l'un des plus séduisant devrait être celui qui, d'un côté examine de quelle mainère on peut diminuer les causes mésologiques (causes produites par le milieu) de la détérioration des hommes,—et qui de l'autre côté étudie de quelle façon on peut faciliter la " circulation " des supérieurs qui se trouvent en bas et des " inférieurs " qui se trouvent en haut, afin de grouper dans les classes supérieures le plus grand nombre des " meilleurs."

THE CAUSE OF THE INFERIORITY OF PHYSICAL AND MENTAL CHARACTERS IN THE LOWER SOCIAL CLASSES.

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If one classes mankind which composes society according to income (and it is relatively easy to make this classification either from statistics or from individual research) one forms groups or *economic classes* different enough from each other, which, however, can be compared. At the two extremities of the series of groups thus formed one will have on one side the groups forming the *leisured classes*, and on the other groups composed of the *poorer classes*.

In the same manner one can classify the districts of a town according to their social and economic indications as : average rental in each district ; number of workpeople and masters ; number of servants ; number of illiterate persons, etc. One forms thus two groups of inhabitants : the inhabitants of the wealthy quarters (*superior classes*, *leisured classes*) and the inhabitants of the poor quarters (poorer classes, inferior classes).

So, if we group mankind according to professional categories, we construct *professional groups* very different one from the other, groups which can be compared, and some of which represent in a characteristic

fashion ease and a high social position, while others represent misery, poverty, and a lower social elevation.

Having formed these groups we can compare the characters of men of the poorer classes with the characters of men of the leisured classes—and the characters of men of an inferior class with those of men of a superior class.

But, in a series of researches and personal investigations—very modest but persevering—I took especial care to compare economic groups, social and professional, as different as possible from one another; and I believe one can thus demonstrate the importance of the *physical and mental* differences separating men belonging to different social and economic classes.

Suppose, for example, we have to compare two groups of men differing from each other by belongnig to two different professional or economic classes, such as *peasants* and *students*—or *leisured persons* with *poor persons*. I proposed to determine, for each of the two groups to be compared, first the *physical* and *physiological characters* (as, the size, the weight, the circumference of the thorax, the strength measured by the dynamometer, the capacity of the skull without forgetting the other cranial characters, the epoch of puberty, the rapidity of growth, etc.). Next, I endeavoured to measure, in the two groups to be compared, the *psychophysiological characters* expressible in figures, such as, the different varieties of sensibility (which can be discovered by the aid of the instruments of precision of experimental psychology) and the various forms of the operation of the mentality that can be made evident through the aid of *mental tests*.

Thirdly, I proceeded to the measurement of the *demographic characters* belonging to each group, such as the birth rate, the mortality, the virility, the morbidity, the age of marriage, the attraction of similars, the rate of movement from place to place.

There remained for me finally to fix the *causes* which determine—amongst groups so different from the point of view of profession or leisure—the formation or persistance of proved characters.*

Before summing up the results obtained, may I be permitted to say a few words on the subject of the method.

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*We allow ourselves to refer the reader to our works on this subject: *Les Classes Pauvres,* one vol., Paris, Giard and Briére, publishers, 1905; *Forza e Ricchezza,* one vol., Turin, Bocca, publisher; and Barcellona, Henrich, publisher, 1906; *Ricerche sui Contadini,* one vol., Sandron, publisher, Milan, Palermo, 1907; *Anthropologie der Nichtbesitzenden Klassen,* one vol., Maas and Suchtelen, publishers, Leipiz and Amsterdam, 1910; *Anthropologia delle classi povere,* Milan, 1910, Vallardi, publisher, and the memoirs: *Contribution à l'étude des correlations entre le bien-être économique et quelques faits de la vie démographique, etc.,* in the Journal of the Statistic Society of Paris, August, 1911, and *A propos de quelques Comparaisons entre les mensurations obtenues sur les sujets appartenant à des classes sociales différentes,* in *Bull. de la Société d' Anthropologie de Paris,* 1911, etc.

In the presence of the heterogeneous mass of the population formed by thousands of molecules the one differing from the other, we can first of all group together those which resemble each other from the point of view of comfort, and we are able in consequence to construct groups of well off and of poor persons : thus, in the elementary and secondary schools of Lausanne I have chosen groups of children in good circumstances and groups of poor children, using for this classification information derived from the teacher, or the indication furnished by the profession of the father of the child. One can also compare the children of a primary school situated in a poor quarter of the town with the children of a private school frequented by those belonging to a higher economic class. After having, so to speak, woven together in such a fashion the web of life of the population we can undo it in order to reconstruct it in a fresh design ; that is to say, according to professions ; the numerous recruits of the Italian army, for example, classified according to the profession, have permitted us to study physical and other characters noted on the anthropometric document of the conscript grouped according to the profession.

Finally, we can yet again unmake the cloth we have woven, to construct with the same elements furnished by the population a new embroidery ; for after having assembled men according to their degree of comfort, and having then grouped them according to their profession, I can further group them according to whether they inhabit the rich or poor zones of the same country ; or, better still, according as they inhabit the rich or poor quarters of the same town. Thanks to these methods, and to others which I pass over in silence, we are able to compose—by the aid of the innumerable human mosaics formed by the population—designs which bring face to face economic, social, professional and territorial groups totally different one from the other. In these groups, so composed, we can endeavour to study the characters which are special to each of them. This is precisely the method we have followed in our labours. What are the results of this physical, mental, and demographic exploration of groups so different the one from the other ?

We must say, first of all, that one can avail oneself of a very abundant material composed of observations made by several authors in different places and at different times, even though collected with an aim very diverse from that which occupies us. I recall at random the anthropometric data of Spanish, French, and Saxon conscripts classed according to their profession ; I recall the figures concerning sensibility obtained by the researches of experimental psychology in comparing normal subjects (students or workmen), abnormal subjects (such as the insane, criminals, the backward) ; I recall also the very numerous data gathered more or less everywhere on the birth rate, the death rate, and other facts of demographic life connected with the profession, degree of comfort, the territorial zone, etc.

But to utilise these data one must sort out all this material, removing every observation (and it must be said that it entails a great quantity of data) which does not respond to the precepts of statistic methodology (homogeneousness, insufficiency of the number of observations, material which cannot be compared, and so on). Then one must elaborate the usable material by a more exact method than that already employed; I mean that one must endeavour to introduce into the elaboration those recent methods of statistical analysis which have given to methodology a new flight.

The first chapter of our researches is therefore a chapter of critical history and of reconstruction.

The second chapter, on the contrary, is made up of the following personal investigations. I have taken the anthropometric measurements of about 4,000 children of the two sexes belonging to primary and secondary schools in Lausanne, classified according to their degree of comfort; I have then compared from the point of view of their physical development and of sensibility tested by the aid of the esthesiometer of Brown-Séquard, groups of workmen and groups of my Law Students—I have, besides, studied, one by one, a hundred skulls from the ossuary of one of the poorest rural communes of the south of Italy (in order to make anthropometric and morphological observations on the dry skull of a professional group of the very poor)—and, finally, I have put in co-relation, making use of the well-known co-efficients of co-relation, the indications of economic comfort in the different quarters of Lausanne, with the rates of mortality, the causes of death, etc., for the same quarters.

I pass over in silence many other soundings taken in this sort of ocean so extended and so suggestive, for I am anxious to arrive at conclusions.

I think I do not deceive myself in asserting that the groups formed by individuals belonging to the lower *classes present, in comparison with subjects of the higher classes, a lesser development of the figure, of the cranial circumference, of the sensibility, of the resistance to mental fatigue, a delay in the epoch when puberty manifests itself, a slowness in the growth, a larger number of anomalies and of cases of arrested development;* in brief, a very large number of indications which can be expressed with all the exactitude of figures, denoting an *organism which places itself*—in a binominal curve where should be ranked the different human values, *in the direction of the lowest values.*

The groups formed by these same individuals belonging to the lower classes present in addition *demographic characters* well known by statisticians; the lower classes have a *greater death rate and a greater birth rate; the frequency of certain causes of death; a lower rate of movement from place to place; precocity in the age of marriage; a predilection for certain forms of crime, etc.*

But it seems to me necessary to call the attention of the reader to this fact: the great importance which, according to us, the physical and mental characters of men have in demography. These characters are intimately bound up with the demographic characters, for I believe it is the *physical and mental characters of men* (measurable in figures and so constituting the first chapter of demography) *which contribute sensibly to unite men in groups of similars; to push them towards certain determined professional groups; to make them mount or descend the steps of the social ladder, and by that to create the special demographic life of each group.*

In other terms, I think if we class men forming the population after their physical and mental characters we obtain a sort of graphic representation of which all other graphic representations ranking men according to their social, economic, and demographic characters, are only a derivation and a deformation.

Here, then, is the question which arises: What are the causes which produce amongst men of inferior social groups, the characters which we have indicated?

It is beyond doubt that the *mesological conditions* in which these men live constitute one of the reasons of the deterioration, and of the inferiority of their physical, mental and other characters. But there exists also another very important category of causes; these are the *individual characters* which each man brings with him at birth, and which constitute the physical and mental patrimony of the individual, a patrimony which accompanies him throughout his life. *Thanks to the simple play of biological variability each man is born different to all other men;* and by that each human specimen takes his special place in the binomial curve of the characters and aptitudes of individuals.

Men who are born with physiological and mental characters of an inferior order tend to sink into the inferior classes or tend to remain at a low level if born there. Vice versâ, *men who are born owning superior characters tend to elevate themselves, or to remain in the high economic, social, and intellectual positions which they already occupy.*

It is, therefore, thanks to this continual selection, and to this passage—more or less interrupted, and more or less complete—of the social molecules through the groups and degrees of society, that our investigations and figures discover individual characters of inferiority in the lower classes of society, and opposite characters in the upper classes.

Let us now make a second approximation. I have only spoken so far of the *mean proportions*. The average, for example, of all the figures indicating the sensibility (measured by the esthesiometer) in a group of poor children shows a lesser sensibility than that presented by the average obtained in a group of children of a better class. But, if instead of comparing the two averages I compare together the two *curves* in their entirety

from which each average results, I discover a fact which is, to my mind, of the greatest importance.

In superposing, indeed, the curve of sensibility of the poor on that of the rich children, I find—it is true—that the more numerous class (and that which coincides with the average) indicates a higher sensibility for the leisured subjects—but I find also *that there exists amongst the poor subjects a certain quantity of individuals of a higher sensibility—and amongst the leisured subjects a certain quantity of subjects of an inferior sensibility.* The analysis of the figures in a series brings into relief, consequently, facts which the average had hidden from us. And what is true of sensibility is also true of the other characters.

One can therefore demonstrate the existence of a little group of "superiors" in the inferior classes, and a little group of "inferiors" in the superior classes.

Is it not between the individuals forming these two exceptional groups that take place the *social exchanges* which permit the better and more clever to ascend from below and which force the degenerates from above to fall to a lower level?

The analysis of human groups so conducted enlarges—if I do not deceive myself—the horizon of one of the most living and palpitating chapters of anthropology. It creates a new branch of anthropology that one might call *Anthropology of the Poorer Classes* or *Anthropology of Social Classes*, which studies the physical and mental characters of men—and which also studies the manner in which the *circulation* of the social molecules can be facilitated. But while taking into account the physical and mental inferiority of the inferior classes it finds, however, the existence of a certain quantity of *inferiors* in the superior classes, and of *superiors* in the inferior classes.

Amongst the chapters of Eugenics—which proposes to itself the study of the physical and mental amelioration of the race—one of the most seductive should be that which on the one side seeks to discover in what way one can diminish the mesological causes (causes produced by the mean) of the deterioration of men—and which on the other side studies in what fashion one can facilitate the "circulation" of the superiors who find themselves below, and of the inferiors who find themselves above, in order to group in the superior classes the greatest number of "superiors."

LA FERTILITÉ DES MARIAGES SUIVANT LA PROFESSION ET LA SITUATION SOCIALE.

par M. Lucien March.

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L'étude comparative de la fertilité des mariages est l'une des plus importantes parmi celles que peut se proposer la science eugénique. C'est par le moyen de cette étude que l'on mettra peut-être en juste lumière les facteurs de la restriction des naissances, là où l'on est en droit de supposer que cette restriction peut porter préjudice aux qualités de la race.

Le relevé des naissances annuelles, même établi par catégories de population, ne saurait donner de résultats aussi satisfaisants qu'une statistique de familles, d'abord parce que c'est en observant une même famille à ses divers états, sa fécondité et sa vitalité, qu'on peut espérer sonder les causes qui déterminent cette fécondité et cette vitalité; puis, parce que la différentiation des catégories suivant la natalité résulte du rapprochement de deux documents officiels: le bulletin de recensement et le bulletin de naissonce, difficiles à mettre d'accord, tandis que le compte des enfants par famille, et le relevé de certains caractères de la famille, peuvent s'opérer sur un seul document, sur un bulletin de recensement ou sur un bulletin de décès.

Malheureusement, les statistiques de familles sont peu nombreuses. Les premières recherches, soit d'après les registres de l'état civil, soit d'après des généalogies, ont été faites en Grande-Bretagne, mais, elles portent sur des familles choisies.

En 1890, M.M. Rubin et Westergaard ont procédé à une enquête gènérale, au moment du recensement, sur les familles de la Ville de Copenhague et de quelques districts danois. Ces familles ont été classées par catégories professionnelles ou sociales, et le même travail a été repris par M. Cordt Trap, en 1900.

Il n'est guère de pays où l'on ait fait un relevé complet des familles classées suivant le nombre de leurs enfants. Cependant en France, de 1886 à 1901, les familles recensées tous les cinq ans sur le territoire entier ont été classées d'après le nombre des enfants survivants, au moment du recensement. Aucun renseignement n'a été alors recueilli sur le nombre total des enfants nés, de sorte que les chiffres publiés font ressortir. non la productivité totale des mariages, mais l'effet combiné de cette productivité et de la mortalité. De plus, aucune distinction n'a été opérée suivant les classes sociales ou professionnelles.

En 1906, pour la première fois, la statistique française des familles a porté sur tous les enfants nés en distinguant les enfants survivants le jour

du recensement et les enfants morts depuis leur naissance. De plus, les familles ont été classées suivant la profession et la situation du chef de famille.

Bien que cette statistique soit la première où l'on ait étendu à tout un pays l'étude de la fertilité des mariages suivant la profession, certaines des statistiques précédemment dressées ont fourni des indications précieuses sur les rapports entre la situation sociale et la fertilité. Les enquêtes fondées sur des généalogies, notamment celles d'Anseele, de Colin, de Pearson, de Fahlbeck, d'assez nombreuses statistiques de familles suivant l'habitat soit à la ville, soit à la campagne, ou bien d'après le degré présumé d'aisance, suivant que le domicile est dans un quartier riche ou dans un quartier pauvre de certaines capitales, ou encore d'après le nombre des domestiques, ont permis d'établir un rapport étroit entre la fertilité et l'habitat, soit urbain, soit rural, ou le degré d'aisance, le milieu. On est aujourd'hui fixè, dans une certaine mesure, sur les causes générales de la restriction de la fertilité, là où elle se produit, et l'on résume ces causes en disant que la restriction est liée, à notre époque comme dans le monde ancien, au développement de la civilisation, ou tout au moins d'une certaine forme de civilisation. C'est là, comme l'a remarqué le professeur Fahlbeck dans une magistrale communication à l'Institut international de Statistique, faite à Londres en 1905, qu'est le danger dont se préoccupent, à bon droit, les eugénistes.

L'effet bienfaisant de cette civilisation se résume aux yeux du plus grand nombre par un accroissement de liberté individuelle et une plus grande égalité. N'est-ce pas précisément dans cette libération croissante à l'égard des forces naturelles et dans une susceptibilité de plus en plus aïgue, de plus en plus ombrageuse, à l'égard des inégalités naturelles ou acquises, qu'il faut chercher les raisons profondes de la restriction volontaire qui semble menacer les œuvres vives de toute société civilisée?

Les statistiques de familles doivent nous permettre d'établir des distinctions suggestives.

Elles cherchent à distinguer, à ramener à une exacte valeur, les différents facteurs du déclin des naissances dont on condense l'expression dans le mot civilisation. Est-il certain en particulier que les classes les plus pauvres, et sans doute les moins adaptées à la vie progressive, soient les plus prolifiques, en sorte que ce sont elles qui assurent une bonne partie du recrutement des générations nouvelles? Ou dans quelle mesure en est-il ainsi?

Un examen détaillé et méthodique de statistiques de familles classées par profession semble indispensable; c'est pourquoi nous présentons à ce premier Congrès celles qui ont été dressées en France au cours des dernières années.

I.

La statistique dressée en France à la suite du recensement de 1906 (1) a pour instrument le bulletin individuel de ce recensement.

On a, pour ce but spécial, dépouillé les bulletins des hommes mariés, veufs ou divorcés et des femmes veuves. On a choisi les bulletins des hommes mariés parce que ceux-ci sont en général mieux remplis que ceux des femmes mariées.

D'une manière générale, dans la population française, le nombre des enfants par famille est peu élevé. La baisse de la natalité, qui constitue un phénomène assez général à notre époque, a commencé en France beaucoup plus tôt que dans les autres pays et cela suffit à expliquer qu'aujourd'hui le nombre des naissances annuelles soit relativement faible.

Dans l'ensemble des 11.5 millions de familles françaises recensées en 1906, on a compté 293 enfants légitimes nés vivants par 100 familles. Mais, cette moyenne groupe les hommes mariés, les veufs, les veuves, les divorcés; elle ne tient compte ni de la durée du mariage, ni de l'âge du chef de famille; elle ne fournit donc pas un très bon instrument de comparaison.

On obtient une meilleure mesure de la productivité des familles si l'on considère par exemple les familles dont le chef est âgé de 60 à 65 ans; on trouve alors que le nombre moyen des enfants nés par 100 familles est de 354(2). En ne comptant que les familles dont le chef est un homme marié, ce nombre moyen s'élève à 360 et nous avons la possibilité d'examiner ce qu'il devient, suivant la catégorie sociale: presque égal à la moyenne pour les patrons 359, il s'élève à 404 chez les ouvriers et descend à 300 chez les employés. Ces valeurs sont significatives; pourtant, on peut se demander si leurs différences ne tiennent pas à l'inégale durée des mariages, car les ouvriers se marient généralement plus tôt que les employés et que les patrons.

Considérons en conséquence les mariages ayant duré 25 ans et plus. Pour ces mariages, l'ordre est encore le même que précédemment, les chiffres sont peu différents des autres: le nombre des enfants pour 100 familles est égal à 303 chez les employés, s'élève à 360 chez les patrons et atteint 409 chez les ouvriers.

Avant d'entrer dans plus de détails relativement aux catégories précédentes, nous comparerons tout de suite ces catégories à d'autres qui se trouvent en dehors du classement professionnel proprement dit.

L'une des nouvelles catégories comprend les rentiers et chefs de famille déclarés retraités, sans profession, etc. Pour ces derniers, et en ne considérant toujours que les hommes mariés, le nombre des enfants par 100

(1) Statistique Générale de la France.—Statistique des familles en 1906.

(2) Au-delà de 65 ans, le nombre déclaré diminue, sans doute parce que les personnes âgées ont perdu le souvenir d'enfants décédés en bas âge.

familles est 292 à l'âge de 60 à 64 ans, soit un chiffre inférieur à celui des patrons et même à celui des employés. Dans le cas des rentiers, il est vrai, le nombre moyen d'enfants par 100 familles continue à croître à mesure que l'âge augmente, il atteint 332 quand le chef de famille dépasse 70 ans, tandis qu'au-delà de 70 ans, la moyenne ne dépasse pas 310 chez les employés et 360 chez les patrons. Le fait d'omettre des enfants en bas-âge est sans doute plus fréquent chez les ouvriers que chez les employés et surtout que chez les retraités, rentiers, etc. De plus, la catégorie des rentiers comprend un grand nombre de personnes âgées qui appartenaient autrefois, soit à la catégorie des patrons, soit à la catégorie des employés et qui ont joint, à une forte longévité, le fait d'avoir une nombreuse famille.

De ces rèsultats, nous conclurons qu'à l'âge où la productivité des mariages a atteint son maximum, cette productivité est un peu moindre parmi les rentiers et personnes sans profession que parmi l'ensemble des patrons de l'agriculture, de l'industrie, du commerce ou des professions libérales.

Dans une seconde catégorie sont compris les pêcheurs et marins du commerce, dont la fécondité est particulièrement élevée : 486 enfants pour 100 familles, chez les hommes mariés âgés de 60 à 65 ans. De toutes les catégories considérées jusqu'à présent, c'est donc celle qui possède la plus forte productivité.

Enfin, une troisième catégorie, dont la valeur sociale est moindre assurément que celle des précédentes, comprend les hospitalisés, les détenus, les nomades, ceux qui, à quelque titre et à un degré plus ou moins élevé, constituent une charge pour la société, quoique certains, à quelque moment, aient fait œuvre utile.

Dans cette catégorie, on retrouve une particularité déjà notée chez les rentiers, retraités et personnes sans profession : la productivité n'atteint pas son maximum aux âges de 60 à 65 ans. Parmi les hommes mariés, on compte, à cet âge, 316 enfants par 100 familles ; on en compte 334 de 65 à 70 ans et 353 à plus de 70 ans.

La catégorie des hospitalisés comprend, comme celle des rentiers, des individus qui, durant la période normale de la vie, ont appartenu à d'autres catégories. Varisemblablement, la majeure partie des rentiers provient des patrons, des employés, des pêcheurs, des militaires, tandis que la majeure partie des hospitalisés provient des ouvriers et assimilés.

Dans les deux cas, l'homme qui cessé de travailler vers 60 ans a moins d'enfants que celui qui continue. Lorsque ce dernier cesse à son tour de travailler à 70 ans, les nombre relativement élevé de ses enfants accroît la moyenne.

Résumons ces premières indications en comparant les nombres moyens d'enfants pour 100 hommes mariés dans la catégorie d'âge où ce nombre est maximum, pour les catégories qui viennent d'être énumérées :

Pêcheurs et marins du commerce	486	(3.000 de 60 à 64 ans).
Ouvriers	404	(140.000 de 60 à 64 ans).
Patrons	360	(360.000 de 60 à 64 ans 280.000 au-delà de 65 ans).
Hospitalisés, détenus, nomades...	353	(5.000 de 70 ans et plus).
Rentiers, personnes sans profession	332	(145.000 de 70 ans et plus).
Employés	310	(5.000 de plus de 70 ans).

Considérons maintenant les mêmes catègories classées, non plus suivant l'âge du chef de famille, mais suivant la durée du mariage. Nous obtenons, dans les catégories les plus nombreuses et pour les mariages ayant duré plus de 25 ans, les nombres moyens ci-après : ouvriers, 409, patrons, 360, rentiers et personnes sans profession, 307.

Nous avons donc le droit d'affirmer, après avoir tenu compte de l'influence de l'âge et de la durée du mariage, que la productivité des mariages est plus forte parmi les ouvriers que parmi les patrons, et plus forte parmi les patrons qui ont conservé cette qualité que parmi les personnes vivant exclusivement de leurs revenus.

Mais, les patrons, comme les ouvriers et les employés, se différencient par la profession : il est possible que la force productivité des patrons âgés peut venir du fait que ces patrons sont en majeure partie des agriculteurs.

Formons donc un premier classement en séparant l'agriculture, l'industrie (y compris les transports), le commerce et les professions libérales. Pour 100 patrons mariés depuis plus de 25 ans, on compte :

	Plus de 25 ans de mariage.		
		Tous âges.	60 à 70 ans.
	Nombre.	Enfants nés p. 100 familles.	Enfants nés p. 100 familles.
Agriculture	560,000	371	370
Industrie	225,000	382	385
Commerce	120,000	340	347
Professional libérales	20,000	303	305
Ensemble	925,000	370	371

La productivité est assez différente, on le voit, d'une catégorie à l'autre, et il est remarquable que la productivité des patrons de l'industrie soit supérieure à celle des patrons de l'agriculture. Celle des patrons du commerce et surtout celle des titulaires de professions libérales sont sensiblement plus faibles.

La situation relative des patrons de l'agriculture et de l'industrie n'est d'ailleurs pas la même quand on considère les mariages ayant duré moins de 25 ans ; pour les mariages ayant duré moins de 5 ans, de 5 à 14 ans ou de 15 à 25 ans, la productivité est plus forte dans l'agriculture que dans l'industrie. Tout se passe comme si les chefs d'exploitations agricoles, après avoir eu plus rapidement que les chefs d'entreprises industrielles un nombre déterminé d'enfants, s'arrêtaient plus tôt que ces derniers.

Le détail des professions permet même de distinguer des groupes d'industries similaires. Le nombre d'enfants p. 100 hommes mariés dépasse 390 dans les mines et carrières, dans la minoterie, dans les industries textiles, dans les entreprises de bâtiment et dans les entreprises de transport, tandis qu'il s'abaisse à 350 et au-dessous dans les industries de l'alimentation dans les industries du livre, dans l'orfèvrerie et la bijouterie. Ce serait donc plutôt dans les grandes industries que les patrons auraient le plus d'enfants et dans les petites qu'ils en auraient le moins.

Parmi les professions commerciales, le nombre moyen d'enfants par 100 familles est surtout élevé chez les bouchers ; il est le plus faible chez les banquiers et chefs d'entreprises financières qui forment une sorte de transition entre les professions industrielles ou commerciales et les professions libérales.

Ainsi, chez les patrons, la productivité semble liée, dans une certaine mesure, à des caractèristiques professionnelles, mais, celles-ci sont assez complexes : d'une part, l'intellectualité de la profession, si l'on peut dire, entraîne une faible productivité puisque le nombre des enfants par famille est faible dans les professions libérales, dans les industries du livre, dans les entreprises financières, tandis que des professions comme celle de boucher comportent une productivité relativement élevée ; d'autre part. cependant, les chefs de grandes industries semblent avoir une productivité supérieure à celle des petits industriels et dès commercants.

Il nous semble entrevoir deux facteurs agissant d'une façon quasi indépendants ; d'un côté le caractère intellectuel de la profession qui porte aux mariages tardifs et crée un milieu peu favorable à la fécondité pour des raisons qu'il n'est point nécessaire de développer ici ; d'un autre côté, la préoccupation du sort réservé aux enfants. Dans les grandes entreprises, ceux-ci trouveront aisément l'emploi de leurs aptitudes et obtiendront sans trop de difficultés des situations équivalentes à celles de leurs parents, soit à l'intérieur, soit à l'extérieur du pays. Dans les petites entreprises au contraire, et sauf les cas particuliers tels que celui des bouchers où l'emploi de la main-d'œuvre familiale est presque une condition de réussite, le père de famille ne voit pas à l'avance, sans inquiétude, l'avenir réservé à ses enfants.

Certaines de ces caractéristiques vont se retrouver chez les employés et chez les ouvriers.

Parmi les employés, ce sont les garçons bouchers qui accusent la plus forte productivité, puis les surveillants et contremaîtres dont la productivité semble voisine de celle des ouvriers. Les nombres d'enfants les plus faibles s'observent parmi les commis de magasins, les garçons de café, de restaurant, d'hôtel, les employés de bureau et les employés de services publics.

Chez les ouvriers enfin, la plus forte productivité—en moyenne plus de 5 enfants nés par famille fondée depuis plus de 25 ans—est le fait des ouvriers mineurs et des ouvriers de filature.

On remarque que les tisseurs, parmi lesquels sont compris un grand nombre de tisserands à domicile, ont une moindre productivité que les fileurs (489 p. 100 familles contre 540 chez les fileurs). On remarque encore que, dans l'agriculture, les domestiques de ferme, généralement logés à la ferme, ont 395 enfants par 100 familles, tandis que les ouvriers agricoles proprement dits en ont 426.

Mais, les industries dans lesquelles les ouvriers ont moins de 4 enfants par famille sont nombreuses. Ont environ 350 enfants par 100 familles fondées depuis plus de 25 ans, les sabotiers, tonneliers, tablettiers, selliers, tailleurs, imprimeurs, ouvriers en métaux, électriciens, bijoutiers et orfèvres, les ouvriers divers occupés dans le commerce, les cochers, les livreurs. Il semble que les professions exercées en petite industrie, et surtout les professions qualifiées exercées dans les villes, donnent les chiffres les plus faibles. Pour les manœuvres, journaliers, gens sans métier, occupés généralement dans les villes, on compte 464 enfants nés p. 100 familles. Parmi les ouvriers des services industriels de l'Etat, les cantonniers, etc., la productivité dépasse 390 enfants nés p. 100 familles; elle s'abaisse à 360 parmi les employés da la police, des douanes, etc., à 350 pour les ouvriers et sous-agents des postes et télégraphes.

Enfin, parmi les domestiques attachés à la personne, elle descend au-dessous de 3 enfants nés par famille, toujours pour les chefs de famille mariés depuis plus de 25 ans.

En résumé, parmi les ouvriers, les ouvriers de grandes industries où le travail est relativement régulier et abondant, où les exploitations offrent une réelle stabilité, où l'habitation est soit à la campagne, soit dans des agglomérations industrielles groupant des ouvriers de même classe, la productivité est relativement élevée; elle est plus faible là où les petits artisans demeurent nombreux, dans les métiers exercés à la ville, là aussi où la profession fait appel au moindre degré, à la force physique. Elle est plus faible encore là où les personnes classées comme ouvriers confinent à la catégorie des employés et surtout là où les conditions de l'emploi, les conditions du logement font préférer les ménages sans enfant, ou avec peu d'enfants, aux ménages chargés d'enfants.

De l'ensemble des constatations précédentes, nous retiendrons que si les ouvriers ont en général plus d'enfants que les patrons, il ne manque pas

de professions où ils en ont moins. En second lieu, pour les uns et les autres, ce sont les grandes industries qui semblent les plus favorables à la productivité, les petites le moins favorables. Naturellement ici l'influence du milieu exerce une certaine action, les régions de grande industrie sont généralement autres que celles de petite industrie.

On tiendra compte de l'influence de la région en considérant à part quelques départements.

Prenons, par exemple, un département de grande industrie et d'assez grande culture, comme le Nord, où d'ailleurs la fécondité est généralement élevée, et un département d'herbages comme le Calvados qui appartient à une région où les naissances sont restreintes et où dominent les petites et moyennes exploitations.

Nous calculerons la productivité des familles dont le chef est âgé de 60 à 70 ans et est marié depuis plus de 25 ans.

Dans les deux départements, les pêcheurs et marins ont la plus forte productivité, mais ils ont 747 enfants par 100 familles dans le Nord, contre 559 seulement dans le Calvados. Dans le premier département, les hospitalisés, détenus, etc., ont près de 6 enfants par famille, plus que les ouvriers chez qui on en compte également près de 6; dans le second, le nombre des familles de cette catégorie est trop faible pour qu'on puisse tenir compte de leur productivité, laquelle est d'ailleurs plus faible que celle des ouvriers. Dans les deux départements, les rentiers et personnes sans profession ont moins d'enfants que les ouvriers et que les patrons; des deux parts, les employés composent la catégorie la moins productive.

Dans le Calvados, il est difficile de pousser plus loin les subdivisions, étant donné qu'il faut éviter l'influence de l'âge et de la durée de mariage.

Nous noterons seulement quelques uns des points où les observations générales, faites pour la France entière, se trouvent confirmées. Ainsi, dans les deux départements, les surveillants et contermaîtres, classés parmi les employés, ont une productivité intermédiaire entre celle des employés et celle des ouvriers. Si l'on représente par 100, la productivité des familles de chaque catégorie professionnelle dans le Nord, on trouve, pour le Calvados, les valeurs suivantes (en s'en tenant aux catégories un peu nombreuses, comprenant plus de 100 familles):

Rentiers, etc.	52
Patrons agricoles	54
Patrons de l'industrie	63
Patrons du commerce	54
Employés de chemins de fer	90
Employés de Services publics	77
Ouvriers et domestiques agricoles	63
Ouvriers de bâtiment	69
Manœuvres	64
Ouvriers de Services publics	59

On remarquera que les employés proprement dits des chemins de fer et tramways et les employés de services publics sont ceux dont la productivité diffère le moins, d'un département à l'autre. Le nombre d'enfants nés par famille est au contraire le plus différent chez les rentiers, les cultivateurs, les commerçants et les manœuvres ou ouvriers sans métier (ceux-ci étant d'ailleurs peu nombreux dans le Calvados).

Ce sont dans ces dernières catégories que se trouvent vraisemblablement les familles ayant les plus anciennes attaches dans le département. Au contraire, les employés des services publics ou des chemins de fer changent souvent de département; ils ont en tout cas une productivité spécifique plus marquée que les autres catégories.

Cet exemple suffira pour faire ressortir l'influence propre de l'habitat et pour indiquer qu'indépendamment de cette influence, la productivité dépend, dans une mesure au moins aussi large, de la profession.

II.

Les observations précédentes confirment, quoique point entièrement, celles qui ont été souvent faites sur la relation entre la fertilité et la situation sociale. Celle-ci étant fonction à la fois du revenu et de l'éducation, ce sont les catégories les plus fortunées et celles où l'education est la plus affinée, où le nombre des enfants serait le plus restreint. Au contraire, la fertilité serait le plus élevée dans les milieux les plus pauvres dans ceux où le genre de vie est le plus grossier (1).

Si, d'une maniére générale, il y a dans cette observation une forte part de vérité—la comparaison des quartiers des grandes villes, celle des catégories classées d'après des signes extérieurs de revenu le démontrent—il est cependant des modalités dont il faut tenir compte. Nul doute par exemple que les patrons soient en général plus fortunés que leurs employées et cependant ils ont sensiblement plus d'enfants que ces derniers. D'autre part, les employés qui reçoivent des émoluments généralement supérieurs à ceux des ouvriers ont moins d'enfants que ces derniers; il est vrai que le milieu social est différent.

La question a été souvent examinée; elle est assez importante pour qu'on y apporte de nouvelles contributions.

Nous emprunterons de nouvelles indications à une statistique récente dressée en France à l'aide de bulletins de famille remplis en 1907 par un grand nombre d'employés et d'ouvriers rétribués sur les budgets de l'Etat, des départements et des communes(2).

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(1) Voir notament la recherche faite à Londres, à l'hopital de Great Ormand Street (Journ. of the Royal Statistical Society, Mai, 1911, et Avril, 1912).

(2) Conseil supérieur de Statistique, Bulletins 10 et 11. Statistique Généale de la France.—Statistique des familles en 1906.

Ces fonctionnaires ont été classés suivant le montant annuel de leurs émoluments actuels et, considérant seulement ceux dont le mariage a duré plus de 15 ans, on a calculé les nombres suivants d'enfants nés par 100 familles.

Saliare annuel en francs.	500 du plus	501 à 1,000	1,001 à 1,500	1,501 à 2,500	2,501 à 4,000	4,001 à 6,000	6,001 à 10,000	plus de 10,000	Ensemble
				Durée de mariage ; 15 à 25 ans.					
Employés	277	241	259	245	223	231	229	238	237
Ouvriers	329	321	293	280	254	234	—	—	307
				Durée de mariage : 25 ans et plus.					
Employés	330	301	305	280	264	264	261	286	285
Ouvriers	348	363	346	329	305	240	—	—	385

Toutes catégories de traitement réunies, les chiffres qui précèdent sont d'accord avec ceux que l'on a déterminés à l'aide du recensement général, soit pour les employés, soit pour les ouvriers et sous-agents des services publics.

Comparant maintenant les nombres d'enfants par catégories de salaires, on remarquera que, chez les ouvriers, la nombre des enfants diminue régulièrement à mesure que le salaire augmente ; chez les employés, il diminue d'abord jusqu'à un minimum atteint pour les employés gagnant de 2.500 à 10.000 francs par an ; il se relève ensuite pour les employés dont le traitement annuel dépasse 10.000 francs.

Pour compléter ces constatations, il convient d'ailleurs de remarquer que les salaires et traitements dépendent, dans une large mesure, de la région ou de l'agglomération où vit chaque employé ou ouvrier. Le changement de la fertilité est soumis à une double influence, le montant du salaire n'intervient que pour une part.

Malheureusement quand on forme des groupes pour lesquels la localité, la situation sociale et la durée de mariage sont les mêmes, on obtient des nombres assez faibles sur lesquels il est difficile d'établir des comparaisons valables.

Pour 400 employés mariés depais plus de 15 ans et appartenant à des administrations dont le siège est à Paris, on a observé, parmi les mariages qui ont duré plus de 15 ans, un léger accroissement de la productivité à mesure que le traitement actuel augmente, mais le groupe des mariages qui ont duré plus de 15 ans est encore peu homogène, les employés ayant des traitements élevés sont généralement plus âgés que les autres.

Pour 1,400 ouvriers de la Ville de Paris, les nombres moyens d'enfants par famille varient comme suit :

(1) Salaire annuel :	501 à 1,000	1,001 à 1,500	1,501 à 2,000	2,001 à 2,500
Mariages ayant duré :				
de 15 à 25 ans ...	240	323	295	303
plus de 25 ans ...	328	387	368	350

L'influence du milieu a été mise en évidence en observant sur toute la France les familles de catégories limitées d'agents disséminés sur tout le territoire, généralement dans les communes rurales : les cantonniers et les garde-champêtres.

Pour ces agents, la fertilité est analogue à celle de la population au milieu de laquelle ils vivent, plus forte dans les régions à natalité élevée, plus faible dans les régions à basse natalité.

On a procédé à une recherche analogue pour les employés proprement dits des préfectures ou des mairies. Le personnel des employés (non compris les garçons, gardiens, ouvriers, etc.) a, en général, d'autant moins d'enfants que le nombre des habitants de la ville est plus élevé ; il en est ainsi pour la population même de ces villes. Mais, si l'on établit le rapport entre la fertilité de ces fonctionnaires et la fertilité générale, on remarque que la première est moins variable que la seconde.

En 1901, 100 familles fondées depuis plus de 15 ans avaient 199 enfants survivants à Paris, 228 dans les villes de plus de 50,000 habitants 266 dans les villes plus petites. Parmi les employés administratifs, les nombres correspondants sont 183-198-215, soit 92%, 87%, 81% des précédents. Les employés ont en quelque sorte une fertilité spécifique qui dépend moins du milieu que celle des ouvriers.

On obtient des résultats analogues aux précédents, quand on détermine le nombre proportionnel des familles stériles.

Parmi les mariages ayant duré plus de 25 ans, le nombre de mariages stériles, sur 1,000 mariages, varie comme suit, suivant le montant du revenu annuel :

Salaire annuel en francs :	Moins de 1,000	1,001 à 1,500	1,501 à 2,500	2,501 à 4,000	4,001 à 6,000	6,001 à 10,000	plus de 10,000	Ensemble
Employés...	95	86	99	113	101	111	109	101
Ouvriers ...	70	74	91	98	100	—	—	78
Et le nombre proportionnel des familles ayant eu plus de 7 enfants.								
Employés...	56	53	41	33	26	23	52	44
Ouvriers ...	95	86	76	55	50	—	—	88

(1) En général pour les personnes gagnant moins de 1000 francs par an, les gains déclarés correspondent à des emplois temporaires ou partiels ; des gains supplémentaires provenant d'autres travaux s'y ajoutent souvent.

III.

En résumé, la statistique de familles françaises dont il vient d'être sommairement rendu compte confirme ce qu'ont appris des recherches relatives à l'influence de la catégorie sociale, du milieu social, du revenu, sur la fertilité. De plus, elle permet de se mieux rendre compte des milieux professionnels favorables ou défavorables à la natalité.

Il semble qu'en France les hospitalisés, nomades, détenus, etc., dont la postérité forme un contingent peu désirable, ont une productivité plutôt inférieure à la moyenne, mais on compte dans cette catégorie des individus internés et par conéqusnt dont la fécondité été pour un temps enrayée. Puis, il ne s'agit ici que de la fécondité légitime.

Les professions agricoles, industrielles, commerciales ou libérales, qui constituent l'ossature de la population, comportent des catégories en quelque sorte spécifiques. Les familles les moins productives seraient celles des employés et ouvriers de services publics, des domestiques attachés à la personne. Puis, celles des titulaires de professions libérales, des employés de commerce ou de banque, des employés de toutes catégories. Viennent ensuite les patrons du commerce, des petites et moyennes industries, les cultivateurs patrons, les domestiques agricoles ou industriels, les patrons de grandes industries, les ouvriers de petites et moyennes industries, et les ouvriers agricoles; puis, avec une productivité supérieure, les journaliers et manoeuvres des villes, les pêcheurs et marins, et enfin, avec la plus forte productivité, les ouvriers des grandes industries, telles que les mines et les filatures(1).

La productivité n'est d'ailleurs pas la plus forte dans les petites communes rurales. Elle est plus élevée dans les communes plus importantes où siègent les grandes entreprises. Mais, elle décroît ensuite dans les grandes villes et prend la valeur la plus faible à Paris. Le phénomène est général; dans les pays où la natalité commence à décliner, le mouvement commence généralement dans la capitale où sont concentrées les professions commerciales et libérales, dont la productivité est très faible.

Le facteur économique " professionnel " semble donc un des plus importants parmi ceux qui déterminent la fertilité; plus important peut-être que le facteur " agglomération."

L'influence du revenu ne semble point avoir, au moins en France, l'importance exclusive qu'on lui a attribuée. Nous constatons bien que les ouvriers ont généralement plus d'enfants que les patrons, mais certaines

(1) J'ai montré dans un rapport antérieur qu'en France, dans les régions de grandes exploitations rurales et dans celles de grandes industries la natalité est plus élevée et a moins décru que dans les régions où dominent les petites exploitations.

catégories de patrons et notamment les chefs de grandes entreprises ont plus d'enfants que d'assez nombreuses catégories d'ouvriers; les employés ont mois d'enfants que les ouvriers. Pourtant, parmi les ouvriers les moins rétribués, ceux dont le travail est le plus irrégulier, le plus sujet aux chômages, comme les journaliers et les manoeuvres, ont plus d'enfants que les ouvriers d'autres catégories mieux assurés contre les risques de l'existence.

On a invoqué aussi comme facteur de l'infertilité le désir de s'élever, ce que Arsène Dumont a appelé la " capillarité sociale." Ici encore il faut distinguer. La progression vers un niveau de plus en plus élevé de bien être, comme tout ce qui exige une activité orientée vers un but fixe, peut déterminer une baisse générale de la nativité; c'est là une des formes sous laquelle intervient la civilisation progressive, mais l'examen des groupes professionnels ne permet pas d'attribuer à cette forme une prépondérance universelle.

On a opposé le prolétaire des grandes agglomérations et l'artisan ou le petit cultivateur, et l'on a dit " que chaque classe a la productivité de la classe à laquelle il veut appartenir "; l'employé a-t-il plus de raisons que le prolétaire ouvrier d'espérer sortir de sa classe? il en sort peut-être moins souvent.

Pour résumer d'un mot ce qui, dans la complexité des facteurs, semble applicable à toutes les professions, à toutes les conditions: la fertilité est peut-être moins généralement gouvernée par le désir de s'élever que par la crainte de déchoir, surexitée, par la conception que l'on a de la vie, et cette crainte est directement liée au *poids* des enfants.

Le poids des enfants, c'est ce que chacun emesure—avec des impressions plus vives qu'autrefois—en songeant à la mobilité croissante de l'existence, au progrès des mœurs, des institutions, de la législation, qui alourdissent la charge, pour la masse de la population.

Nous n'avons point à envisager ici les problèmes qui se posent pour l'eugéniste à propos des soins que nous prenons maintenant pour conserver de mieux en mieux les existences. Il n'apparait pas que ces soins créent, dés à présent, le danger d'une sélection à rebours. Mais, si des mesures sont prises pour compenser les poids des enfants, il serait imprudent de ne point tenir compte de ce danger. De plus, il convient de distinguer les compensations directes et les compensations indirectes, et de prendre garde que ces dernières peuvent avoir des effets incertains à cause de la complexité des facteurs en jeu. Par exemple l'accroissement du revenu d'une catégorie de citoyens peut avoir pour conséquence, non un accroissement, mais une diminution du nombre des enfants dans cette catégorie.

Les compensations directes, proportionnées au poids qu'il s'agit d'alléger, et dirigées sur les milieux où elles sont le mieux susceptibles d'efficacité pour

l'avenir de la race, sont sans doute celles que l'eugéniste recommandera (1). Celui-ci est en face de problèmes aussi complexes que ceux dont s'occupe l'ingénieur ou le médecin; il doit apporter à leur examen la méthode et la prudence dont ceux-ci s'inspirent dans l'exercice de leurs professions.

THE FERTILITY OF MARRIAGES ACCORDING TO PROFESSION AND SOCIAL POSITION.

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TRANSLATOR'S NOTE.—*The French word "patron" has been translated consistently as employer, although it includes members of the learned professions who are not usually classed as employers in England. The word employé has no English equivalent; when used in English, either in the French form employé or in the English form employee, it has a different connotation to the French, as it includes all persons who are employed whether workmen or others. In the French it is used in antithesis to ouvrier, and thus denotes only such employés who are not workmen. It might perhaps be rendered "salaried employés," but in order to avoid the constant repetition of some such cumbrous phrase the word has simply been used as it stands, and is intended to have the same meaning as in French.*

The comparative study of the fertility of marriages is one of the most important of those comprised in the science of eugenics. It is by this study that a clear light may, perhaps, be thrown on the factors which determine the restriction of births in those cases in which it may rightly be supposed to act prejudicially on the qualities of the race.

The annual birth returns, even if made separately for the different classes of the population, would not be able to give such satisfactory results as statistics of families, because in the first place it is by the observation of one and the same family in its different conditions, its fecundity and vitality, that one may hope to fathom the causes which determine this fecundity and vitality; secondly, the distinction into classes, according to birth-rate, necessitates the comparison of two official documents, the census returns (le bulletin de recensement) and the birth returns (le bulletin de naissance

(1) Dans cet order d'idées, il convient de signaler une proposition actuellement soumise au Parlement français par M.M. Henry Chéron et Le Cherpy. Elle a pour objet l' allocation d'une somme de 10 francs par mois, pour tout enfant de moins de 13 ans, né après le troisième, aux chefs de famille qui ont plus de trois enfants de moins de 13 ans et qui appartiennent à une société de secours mutuels contre la maladie.

which are difficult to bring into agreement; whereas the number of children per family, and certain particulars concerning the family, might be recorded on one document only, either census returns or death returns (bulletin de décès).

Unfortunately, family statistics are few. The first researches made, based either on the registers of the civil state or on genealogies, were made in Great Britain, but they referred to selected families.

In 1890 Rubin and Westergaard made a general inquiry, at the time of the census, in the families in the city of Copenhagen and in some Danish districts. These families were classed according to their professional or social status. The same work was taken up again in 1900 by Cordt Trap.

There is no country in which complete statistics have been collected of families classed according to the number of their children and the social status. Meanwhile in France, from 1886-1901, a census was taken every five years throughout the whole country in which the families were grouped according to the number of children surviving at the time of the census. No information was collected on the total number of children born of a kind which could appear in the published figures, nor on the total productivity of marriages; only the combined effect of this productivity and of the deaths which had occurred were investigated. Further, no distinction was made between the different professions and social classes.

In 1906, for the first time, the French statistics dealt with all the children born, distinguishing between children alive on the day of the census and children who had died after birth. Further, the families were classed according to the profession and station of their heads.

Although these statistics were the first in which the study of the fertility of marriages according to occupation covered the whole country, certain previous investigations had furnished valuable information on the relations between social position and fertility. The researches, based on genealogies, particularly those of Anseele, Colin, Pearson, and Fahlbeck, and many statistical inquiries concerning families, grouped according to their habitat in town or country, according to their presumed means, according to their living in a rich or poor quarter of certain capitals, or again according to the number of domestic servants kept, have enabled one to establish a strict relation between fertility and residence in town or country and between fertility and wealth or environment. At the present time the general causes of restriction of fertility, wherever it occurs, are to a certain extent determined, and they are summarised up, in the statement that the restriction is closely connected, in our own time as in the ancient world, with civilisation, or at any rate with a certain form of civilisation. It is there, as Professor Fahlbeck remarked in his masterly communication to the International Institute of Statistics in London in 1905, that the danger exists with which eugenists are rightly concerned.

The beneficent effect of this civilisation appears to most eyes as a growth of individual liberty and of equality. Is it not precisely in this growing freedom with respect to natural forces, and in an impatience growing more acute and more suspicious in respect to natural or acquired inequalities, that one must look for the deeper reasons of the voluntary restriction which appears to threaten the living works of all civilised society?

Family statistics enable us to make some suggestive distinctions, by which we shall endeavour to attach a definite value to the different factors bringing about the decline in the birth-rate expressed shortly in the word civilisation. In particular is it certain that the poorest classes, which are without doubt the least adapted to a life of progress, are the most prolific, in such a way that a great part of the coming generations are certain to be recruited from them? If not, to what extent is it a fact?

A detailed and methodical study of the statistics of families classed according to occupation seems indispensable. That is why we present to this first Congress those which have been prepared in France in recent years.

The statistics prepared in France after the census of 1906(1) is based on the individual census papers. For this special purpose the papers of married men, widowers, divorced men, and widows were examined. The papers of married men were chosen because they were generally better filled in than those of married women.

In a general way, among the French people the number of children per family is very low. The lowering of the birth-rate, a phenomenon quite general in our time, began in France much earlier than in other countries, which is a sufficient explanation of the relative paucity there of the annual number of births.

Taking them altogether, the 11.5 million French families, counted in the census of 1906, had 293 legitimate children born alive to every 100 families. But this average is based on the aggregate of married men, widowers, widows, and divorced persons; it takes no account of the duration of marriage, nor of the age of the head of the family; thus it does not furnish a very good instrument of comparison.

One gets a better measure of the productiveness of families if one considers, for example, those families of which the head was 60-65 years old; one then finds that the mean number of children born for every 100 families is 354(2). When only those families are counted whose head is a married man, the mean number is raised to 360, and we can examine the result of a classification according to social class. Among employers the figure is 359, or almost equal to the average; among workmen it rises to 404; while among employés other than workmen it sinks to 300. These values are signifi-

(1) Statistique Générale de la France.—Statistiques des Familles en 1906.

(2) Above 65 years the declared number diminishes, because, no doubt, aged persons forget about those of their children who have died at an early age.

cant. Yet one may ask whether the differences are not due to inequalities in the duration of the marriages, because workmen usually marry earlier than employés or employers.

Let us, therefore, consider those marriages which had lasted for 25 years and more. Here, as previously, the order is the same, though the figures are slightly different: the number of children per 100 families is 303 for employés, 360 for employers, and 409 for workmen.

Before entering into further details concerning the classes mentioned above, we will compare these classes with others outside the strictly occupational categories. One of the new classes comprises men of private means, and heads of families returned as "retired," "without profession," etc. For these last, at the age of 60-64 years, and still only considering married men, the number of children is 292 per 100 families, that is to say, a lower figure than shown by the employers, and even lower than that of the employés. In the case of men of private means, it is true that the average number of children per 100 families continues to increase with the age, and reaches 332 when the head of the family has passed 70 years, whereas it does not exceed 310 for employés, and 360 for employers. That children who die at an early age are left out in filling in the papers is, without doubt, more common with workmen than with employés, or, more particularly, with men who have retired or who have private means. Further, the latter class comprises a large number of persons of advanced age who would formerly have belonged either to the employers or to the employés, and have lived a long while and had a large family.

From these results we conclude that, at the most productive period of married life, fecundity is a little less among persons with private means or without a profession than among the aggregate of agricultural, industrial, or commercial employers and members of the liberal professions.

In a second class are included fishermen and sailors in the merchant service, whose fecundity is particularly high, namely 486 children per 100 families for men aged 60-65. Of all the classes considered up till now this is the most productive.

Finally, a third class, whose social value is certainly less than the preceding ones, comprises the inhabitants of hospitals, asylums, prisons, and vagabonds; all those who, under one heading or another, constitute a more or less high charge on society, although some of them at one time or another have done useful work. In this class one finds again a peculiarity already noted among men who have retired, live on private means, or are without a profession, namely, that productiveness does not reach its maximum at 60-65 years. Among married men there are at this age 316 children per 100 families; at 65-70 years, 334; and at more than 70, 353.

The hospital (or workhouse *hospitalisé*) class includes, like the man of private means, some individuals who, during the normal part of their lives, belonged to other classes. Probably the greater number of the latter class

were employers, employés, fishermen, or soldiers, whereas the majority of the former were workmen and the like. In both cases the man who stops working when about 60 years old has fewer children than he who goes on. When the latter, in his turn, stops when 70 years old, his relatively large number of children brings up the average.

We will sum up these first indications by comparing the average number of children for every 100 married men of the age group in which this number reaches its highest for those classes which have been enumerated :—

Fishermen and sailors in the merchant service	486	(3,000 60-64 years old)
Workmen	404	(140,000 ,, ,, ,,)
Employers	360	(360,000 ,, ,, ,,) (280,000 above 65 years)
Workhouse inmates, prisoners, vagabonds	353	(5,000 70 years old and older)
Men of private means or without occupation	332	(145,000 ,, ,, ,,)
Employés	310	(5,000 more than 70 years old)

We will now consider the same classes, arranged not according to the age of the head of the family, but according to the duration of the marriage. We obtain in the largest classes, for marriages which have lasted 25 years and more, the following average numbers : Workmen, 409 ; employers, 360 ; men of private means or without profession, 307.

We are, therefore, justified in stating that, after taking into account the effects of age and length of married life, workmen show greater fecundity than employers, and that employers who maintain their occupation are more prolific than persons living entirely on private means.

But employers, like workmen and employés, differ in respect to their occupations ; it is thus possible that much of the fecundity shown by the older members among the first-named arises from the fact that they are agriculturalists. Let us, therefore, make a preliminary classification by distinguishing agriculture, manufactures (here including the transport trades), commerce, and the liberal professions. For every 100 employers married for more than 25 years we get :—

	Married life extending for more than 25 years.		
	Number.	All ages. Children born per 100 families.	60-70 years. Children born per 100 families.
Agriculture	560,000	371	370
Manufactures	225,000	382	385
Commerce	120,000	340	347
Liberal professions ...	20,000	303	305
Totals ...	925,000	370	371

This shows that there are considerable differences in productivity between one class and another, and it is remarkable that manufacturers should be more prolific than agriculturalists. Commercial employers and, in a more marked degree, professional men are sensibly less prolific.

The relative position of agricultural employers and manufacturers is altered if one considers marriages which have lasted less than 25 years; marriages of less than 5 years' duration, of 5-14 years, of 15-25 years are more productive among the former class than among the latter. All this seems as if farmers, after having had more rapidly than merchants the number of children decided on, stopped having them sooner.

By considering the different occupations in detail, one can differentiate between groups of industries of similar nature. The number of children per 100 married men is more than 390 among mine and quarry owners, among flour millers, in the textile trades, the building trades, and the transport trades, while it sinks to 350 and less in the provision trades and book trades, and among goldsmiths and jewellers. This would mean that in the large industries the employers have more children than in the small.

In commerce the average number of children per 100 families is highest among butchers; it is lowest among bankers and financiers, who form a sort of step between industry and commerce on the one hand and the liberal professions on the other.

Thus among employers fecundity seems, to a certain extent, to be connected with the particular characteristics of the occupation, but these are very complex. On the one hand the intellectuality of the profession, if one may use this expression, induces a low productiveness, since the number of children is low in the liberal professions, in the book trades and in financial undertakings, whereas occupations like that of the butcher conduce to a relatively high productiveness; on the other hand, the heads of large industries seem to be more prolific than small industrial employers or tradesmen.

One can apparently distinguish two factors acting in a quasi independent manner; on the one hand there is the intellectual nature of the profession, which leads to late marriages and creates for reasons which need not be further entered into here an environment unfavourable to fecundity; on the other hand there is anxiety for the future of the children. In large concerns the children can easily find employment to suit them, and can obtain without difficulty positions as high as those of their parents, either in the country or out of it. In small concerns, on the contrary, except in particular cases like that of the butcher, where the employment of the labour of different members of the family is almost a condition of success, the father cannot regard without anxiety the future of his children.

Certain of these causes can be found operating also among employés and workmen. Among employés the most productive are journeymen butchers, and next come superintendents and foremen, whose productiveness approximates to that of the workmen. The number of children is smallest

among shop attendants, waiters at restaurants, cafés, and hotels, clerks, and persons employed in public services.

Finally, among workmen, miners and spinning machine operatives are the most prolific; more than five children being born on an average as a result of marriages lasting for 25 years. It is to be noted that weavers, among whom many work in their own homes, are less productive than spinners (489 per 100 families, as against 540); and again, in the agricultural occupations, that farm domestics who generally live in the farm have 395 children per 100 families, whereas agricultural labourers, properly so called, have 426.

But the industries in which the workmen have less than four children are numerous. The following have about 350 children per 100 families of 25 years' standing: Makers of wooden shoes, coopers, toymakers, sadlers, tailors, printers, metalworkers, electricians, jewellers and goldsmiths, the various workmen employed by commercial undertakings, coachmen and persons engaged in delivering goods. It appears that the occupations provided by small industries, and, above all, skilled trades pursued in towns, give the lowest figures. Manual labourers, day labourers, persons without a trade generally employed in towns have 464 children per 100 families. Among workmen in the industrial services of the State, road menders, etc., the productiveness is above 390 per 100 families; it sinks to 360 among policemen and Customs House employés; and to 350 among the workmen and lower grades in the post and telegraph service.

Finally, among domestic servants it sinks below three children born to each family; families in which the head has been married for 25 years having been considered throughout.

To sum up, among workmen, those employed in large industries in which work is relatively regular and abundant, where employment is really stable, where the domicile is either in the country or in industrial communities among workers of the same class, productiveness is comparatively high. It is lower where numerous artisans employed in small concerns live, in trades followed in towns, and also in occupations which do not require the use of physical strength. It is again lower where the persons classed as workmen border on the employé class, and, above all, where the conditions of employment and housing make establishments without children, or with only very few, more to be desired.

The conclusions previously come to, taken together, lead to the observation that workmen in general have more children than employers, though there are occupations in which they have fewer. Secondly, for both workmen and employers large businesses appear to favour productiveness more than small ones. The surroundings naturally exercise a certain influence in determining this, since large businesses are usually carried on in different localities to small. The influence of the locality will be taken into account when certain of the provinces are considered separately. To take, as an example, a pro-

vince like le Nord, in which there are large industries and fairly large farms, here productiveness is usually high; whereas in a grass country like le Calvados births are more restricted, and small or medium-sized holdings are the rule.

We will calculate the productiveness of families of which the head is aged 60-70 years, and has been married for more than 25 years. In both provinces fishermen and sailors are the most productive, but in le Nord they have 747 children per 100 families, against 559 only in le Calvados. In the former hospital inmates and prisoners have almost six children per family, more than workmen, although these also have almost six; in the latter the number of families belonging to the first-named class are too few to take count of their productiveness, but it is less than that of the workmen. In both provinces persons with private means or without profession have fewer children than workmen or employers; in both employés are the least productive class.

In le Calvados it is difficult to take the divisions any further without introducing effects of age and length of marriage. We will only point out that some of the general observations, made for the whole of France, are confirmed. Thus in both provinces, superintendents and foremen, classed among employés, have a productiveness intermediate between that of employers and that of employés. If one represents by the number 100 the productiveness of each occupational class in le Nord, one finds that the corresponding values for Calvados are as follows (only classes containing more than 100 families are taken into consideration):—

Private means, etc.	52	Employés in the public services	77
Farmers	54	Agricultural labourers and domestics	63
Industrial employers ...	63	Workmen employed in the building trades	69
Commercial employers ...	54	Unskilled labourers	64
Railway employés ...	90	Workmen employed in the public services	59

It will be noted that railway and tramway employés, and employés in the public service, differ least in their productiveness between one province and the other. The greatest difference in the number of children born is shown by the men of private means, farmers, merchants and manual and unskilled labourers (the latter being few in number in le Calvados).

It is in the last-named class that the families which have been longest in the province may probably be found. On the other hand, employés in the public services or railways often move from one province to another; they have a specific productiveness more marked than the other classes. This example will suffice to bring out the actual influence of domicile and to indicate that productiveness depends to greater or less extent on the occupation acting directly and not through the medium of this influence.

II.

The previous observations confirm, although not entirely, those which have often been made on the relation between fertility and social status. The latter being the joint product of income and of education, it is among the richest and most highly educated classes that the number of the children should be most restricted. On the other hand, fertility should be highest in the poorest surroundings where the manner of life is the roughest(1). Although this statement is, in a general way, largely true, as shown by a comparison of the different quarters of cities and of different classes grouped according to external indications of income, it is necessary to consider how it should be limited or qualified. There is no doubt, for example, that employers are, in general, wealthier than their employés, yet they have more children than the latter. On the other hand, employés generally receive higher pay than workmen, but have sensibly fewer children; it is true that their social conditions are different.

The question has been often examined; it is important enough to warrant further examination in the light of freshly ascertained facts.

We will borrow the fresh evidence contained in the statistics prepared recently in France from schedules of families filled in in 1907 by a large number of employés and workmen in the pay of the State and of various provinces and parishes(2).

These persons have been classed according to their actual annual emoluments, and taking into account only marriages which have lasted more than 15 years the numbers of children born in every 100 families have been calculated and are given below :—

Annual Emoluments in £.	Less than 20	20 to 40	40 to 60	60 to 100	100 to 160	160 to 240	240 to 400	More than 400	Totals.
Duration of Marriage, 15-25 years.									
Employés ...	277	241	259	245	223	231	229	238	237
Workmen ...	329	321	293	280	254	234	—	—	307
Duration of Marriage, 25 years and more.									
Employés ...	330	301	305	280	264	264	261	286	285
Workmen ...	348	363	346	329	305	240	—	—	385

If all classes are included together the numbers agree with those obtained from the general census for workmen and lower officials in the public services.

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(1) See particularly the investigation made in the Great Ormond Street Hospital, London. (Journal of the Royal Statistical Society, May, 1911, and April, 1912.)

(2) Conseil Supérieur de Statistique, Bulletins 10 and 11. Statistique Générale de la France.—Statistique des Familles en 1906.

If the numbers of children in the different wage classes are now compared, it will be noticed that among the workmen the number of children diminish regularly as the wages increase. Among the employés it decreases till a minimum is reached in the classes earning £100—£400 a year, and rises again when the annual salary is more than £400.

To make the statement complete it must further be remarked that wages and salaries depend, to a large extent, on the locality in which each employé or workman lives. The change of fertility results from a double influence, of which increase of wages is only a part.

Unfortunately, if one makes classes in which the locality, the social station, and the duration of marriage are the same the numbers in each are too small to permit valid comparisons to be made.

Among 400 employés married for more than 15 years, working under administrations situated in Paris, there is a slight increase of productiveness as the actual salary rises; but this group of marriages is not very homogeneous, as the employés with higher salaries are generally older men.

Among 1,400 workmen in the city of Paris the mean number of children per 100 families varies as follows:—

Annual Wages (1)	£20 to £40	£40 to £60	£60 to £80	£80 to £100
Duration of Marriage 15-25 years	240	323	295	303
„ „ more than 25 „	328	387	368	350

Evidence as to the effects of the environment can be obtained by considering throughout the whole of France the families of certain limited classes, the individual members of which are scattered throughout the whole country, particularly in country districts, *e.g.*, the road labourers and "garde champêtres." Among them the fertility is analogous to that of the population in which they live; higher in regions with a high birth-rate, and lower in regions with a low birth-rate.

To proceed to a corresponding investigation concerning the employés in prefectures and municipal offices. These have in general the fewer children the larger the population of the town; this also is the fact concerning the population itself. But if one compares the fertility of the employés with that of the population, one finds that in the first case it is less variable than in the second.

In 1901, 100 families, established for more than 15 years, had 199 surviving children in Paris, 228 in towns with more than 50,000 inhabitants,

(1) In general the declared income of persons earning £40 a year and less is derived from some temporary or partial employment, and is often supplemented by earnings derived from some additional source.

and 266 in smaller towns. Among administrative employés the corresponding numbers were 183, 198, 215, or 92%, 87%, 81% of those previously cited. Employés have in a way a specific fertility which depends less on their surroundings than that of workmen.

Analogous results are obtained if one compares the proportion of sterile marriages.

Among marriages which have lasted for more than 25 years, the number of sterile cases per 1,000 increases with increasing yearly income.

Annual Emoluments in £.	Less than 40	40 to 60	60 to 100	100 to 160	160 to 240	240 to 400	More than 400	Totals.
Employés ...	95	86	99	113	101	111	109	101
Workmen ...	70	74	91	98	100	—	—	78
Proportional number of families of more than seven children.								
Employés ...	56	53	41	33	26	23	52	44
Workmen ...	95	86	76	55	50	—	—	88

III.

To sum up, the statistics of French families, of which a brief account has just been given, confirm what has been previously learnt by researches as to the influence on fertility of social status, social surroundings, and income. Further, they provide better data from which conclusions may be drawn as to what occupations are favourable and what unfavourable to the birth of children.

It appears that in France paupers, vagabonds, prisoners, etc., the descendants of whom form an undesirable addition to the population, are rather lower than the average in productiveness, but among these are reckoned many who are in confinement, whose fecundity is therefore temporarily put a stop to. Further, legitimate children only have been dealt with.

Agriculture, manufacturing industries, commerce, and the learned professions, which form the backbone of the population, admit in some ways of division into specific classes. The least productive families would be those of employés and workmen in the public services and domestic servants. After them come members of the learned professions, the bank clerks and commercial employés, and employés of all classes. Then come commercial employers, small manufacturers and those with moderate sized businesses, farmers, persons who live in engaged on farms or in industries, large employers of labour, workmen in small and medium-sized industrial concerns, and agricultural labourers; then, with a higher degree of productiveness, day labourers and manual labourers in towns, fishermen and sailors, and

finally, the most productive classes, the workmen in large industries, like mines and spinning mills(1).

Productiveness is not highest in small country parishes. It is higher in the more important districts which are the seat of large industries. But it decreases again in cities, and is lowest of all in Paris. This is a general phenomenon in countries in which the birth-rate is beginning to decline, the movement generally begins in the capital where commerce and the learned professions are concentrated, in which the productiveness is very low.

Occupation, therefore, appears one of the most important of the economic factors which determine fertility; more important, perhaps, than the factor "concentration of population."

Income does not appear to have exclusively, at least in France, that influence which is attributed to it. We know for certain that workmen in general have more children than employers, but certain classes of employers, particularly the heads of large enterprises, have more children than many classes of workmen, while employés have fewer children than workmen. Nevertheless, among workmen, the lowest paid, whose work is most irregular and among whom unemployment is most common, as for instance day labourers and unskilled labourers, have more children than those belonging to classes which are more highly paid and better insured against the risks of life.

The desire to rise has also been invoked as a cause of infertility; this Arsène Dumont has called "social capillarity." Here, again, a distinction must be made. Progress towards a higher and higher level of well-being, like everything else which exacts efforts to attain a definite end, can bring about a general fall of the birth-rate; it is one of the ways in which the influence of progressive civilisation is felt, but the examination of the occupational categories forbids us to attribute to it a universal preponderance.

The proletariat in large centres and the artisan or small farmer have been contrasted, and it has been said that each class has the productiveness of the class to which it wishes to belong; but has the employé more hope of rising from his class than the workman?—he rises from it, perhaps, less often. To sum up in a word that which, amidst the complex play of causes, appears to act in all occupations and in all conditions:—fertility is perhaps less generally governed by the desire to rise than by the fear of falling; and the fear is directly bound up with the fact that children are a burden. This fact is what strikes every one more forcibly than formerly, when they think of the growing mobility of existence, of the changes in manners, institutions, and legislation, all of which may put a heavy charge on the mass of the population.

(1) I have shown in a previous report that in France in the regions of large agricultural holdings and large industries the birth-rate is highest, and has decreased less than in regions where small concerns are the rule.

We have not here considered the problems presented to the eugenist by the growing care which is taken to preserve individual lives. It does not appear that danger of a reversed selection is at present introduced thereby. But if measures are taken to compensate for the burden of children, it would be imprudent not to take this danger into account. Further, a distinction must be made between direct and indirect compensations, and it must be borne in mind how uncertain the effects of the latter may be owing to the complexity of the influences at work. For example, increase in the income of one class of citizens may have the effect of diminishing and not increasing the number of their children.

Direct compensations, proportionate to the burden which it is intended to alleviate, and applied in circumstances in which they can act with the best effect on the future of the race, are, no doubt, what the eugenist will recommend(1). Such proposals, in the face of problems as complex as those which confront the engineer or the doctor, should be examined with as much method and prudence as are exercised by members of these professions in discharging the duties of their occupations.

EUGENICS AND MILITARISM.

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The chief peril in infant life—and one but rarely listed in books of hygiene and medicine—is the peril of parentage. Fifteen out of one hundred children born in England die before reaching one year of age. These deaths, says one of the surgeons in a Liverpool infirmary for children, "can scarcely be regarded as due to perils of infant life, as they are due to pre-natal influences." It is exactly because we are coming to recognize that pre-natal influences are the greatest infant life peril of them all that this Congress is being held.

In the decade 1841-1850 the deaths of infants under twelve months in England averaged 153 a year per 1000 births; in the decade 1881-1890 they averaged 142, a gain of but $7^1/_5$ per cent in a half century otherwise characterized by enormous progress in sanitation, preventive hygiene and general medicine. A comparison of the infant mortality rates of England

(1) In this connection attention must be called to a proposal actually placed before the French Parliament by MM. Henry Chéron and Le Cherpy, namely, to allocate a sum of 10 francs a month for every child less than 13 years of age after the third to heads of families having more than three children less than 13 years of age and belonging to societies for mutual assurance against illness.

and Wales for the quinquennial periods 1861-1865 and 1905-1909, shows that the death rate of children under one year of age was but 23 per cent. less in the second or present-day period than in the early one, while there was a difference of 48 per cent. in the mortality in the second year of life, of 59 per cent. in the third, and of 61 per cent. in the fourth. That is, if children can really start living we can now give them a good chance to go on. If, however, they are born actually inadequate to live, no degree of progress in that branch of medicine known as the "care and health of children" can have much interest for them. What they demand, if not for themselves, because it is too late, but for those who are to come, is some radical progress in the care and condition of parents.

But perhaps worse than death to the child, and certainly worse to the race, are those horrible ills of congenital idiocy, pronounced diathesis of disease, inevitable deafmutism and all the rest that the modern study of heredity has shown to be the unescapable fate of the child born of defective parents. So that figures of infant mortality due to pre-natal influences pale into insignificance for the eugenist in the face of the figures of the living doomed to suffering and incapacity and to be a drag on the race. Hence it is that the attention of the eugenist is bound to be attracted to any institution in present human life which may seem to contribute either to the advantage or disadvantage of the eugenic ideal, the well-born child. Any human institution that may increase or decrease that peril in child life, which we may call the peril of parentage, is legitimate field of our interest and study. Such a human institution of great age, great development and great prestige is war.

What would seem logically to be the inevitable consequence of the human selection exercised by war in its actual removal from a given population of an undue proportion of sturdy men by death from wounds and disease, and in its removal in both war and peace times of still larger numbers of its stronger young men from their normal and needed function of race perpetuation, has been pointed out by a few writers from the times of the Greeks to the present. Perhaps the logic of the matter has been more clearly and strongly stated by two philosophical biologists than by most of the others. Herbert Spencer, thirty years ago, and David Starr Jordan, in the very present days, enunciate and emphasize the thesis that the removal by war of the strongest and the leaving at home of the weakest men to propagate the race is bound to have as result a physical deterioration of the population concerned. It is, these men claim, a simple, easily understood phenomenon of artificial selection.

President Jordan has for the last five years made veritable propaganda of this thesis, and thereby drawn to it a fresh and more considerable attention than it has ever before had. Yet during the whole of the last century the thesis has been supported by a succession of men, as Tenon, Dufau, Foissac, Tschouriloff, de Lapouge, Richet and others in France;

Tiedemann and Seeck in Germany; Guerrini in Italy. And all of these men have offered something, if in most cases but a little, in the way of specific facts and figures to substantiate their belief in the racial injury caused by war.

On the other hand there has been at the same time a succession of critics either of the thesis itself or of the specific data offered to prove it. Of these critics I may mention Collignon and Broca in France, Bischoff and Ammon in Germany, and Livi in Italy. And these critics must be fairly heard.

Stress is put in most writings against war on the imposing figures of the actual human mortality due to it. To state that 5,000,000 or 10,000,000 men were lost in the twenty years of the Wars of the Restoration and Empire is, indeed, to give one food for thought. One becomes more thoughtful when one learns that one-third of these men came from a single nation, whose total population at the beginning of the period was but 25,000,000. The Thirty Years' War is reputed to have cost Germany nearly three-fourths of her fighting men. In the last quarter of the 19th century the direct war losses totalled several human millions.

And these figures of mortality by gunfire and exposure and disease in camp and garrison should have added to them the indeterminate but certainly greater figures of deaths in the civil population directly incident to war. Dr. Dumas has shown recently that the death rate in the civil population of both France and Germany was noticeably higher in 1870 and 1871 than in the years immediately preceding and immediately following these two years of strenuous war. In France, for example, it was 2.34 per 100 in 1869, 2.83 in 1870, 3.48 in 1871, and 2.19 in 1872. Dumas found similar examples in the mortality records of Austria, Denmark, and Germany.

Many specific observations of the introduction or distribution of disease in the civil population by the movements of armies or return of soldiers have been made. The diffusion of typhus in Europe by the Napoleonic Wars, the introduction of syphilis into Scotland by Cromwell's troops and into Sweden in 1762 by the Swedish troops returning from the Seven Years' War are examples. During Napoleon's Egyptian campaign nearly every soldier out of an army of 32,000 men was affected by trachoma, and the return of these soldiers initiated a spread of the disease through almost all the European armies. The great European epidemic of smallpox of 1871, especially notable in Germany, is believed to be associated with the Franco-Prussian War. Clemow declares, indeed, that there is scarcely a war in ancient or modern times which does not furnish examples of the special distribution of disease.

But great mortality in itself is not necessarily a great racial catastrophe. Indeed it is, in the face of the geometrical progression by which reproduction advances, one of the veritable conditions of advance in animal

life. Throughout all the kingdom of life, plant as well as animal, the overproduction of individuals and their reduction by death to a fractional part of the original number is one of the basic conditions of progress, if Darwinism is a sound explanation of organic evolution. For this death will be in the nature of things selective, and hence will make for the modification of the species toward a condition of better adaptation to life conditions. Indeed, the upholders of war have used precisely the argument of war's high mortality as a proof of war's real beneficence to the race. Ammon, for example, consistently develops this thesis, cold-bloodedly, to its logical extreme, and Seeck and numerous others are attracted by it in certain degree.

The *crux* in the matter and to my mind the whole answer to such argument is the character of the selection which this mortality determines. I believe it may be shown by two methods that the direct selection of war is not advantageous, but in almost all cases thoroughly disadvantageous to the race. The two methods are, first, the determination of the character of that part of the population especially exposed to the selective mortality of war, and, second, the determination of certain actual results of this selection.

As to the first, one need only draw attention to the way in which an army is made up to make it seem certain that any considerable mortality in military service will of necessity result in a disadvantageous selection of greater or less seriousness. Those who point to the advantages of military selection as issuing from the selective struggle between the opposing armies and from the selective results of the varying endurance and resistance to exposure, disease and wounds of the individuals in each army, do not sufficiently consider the fact that the whole of each army is a group of individuals not chosen at random from the population, representing both sexes, all ages, and weak and strong alike, but is already, by the very conditions of its organization, a part of the population selected first for sex and then for ripe youth, full stature and strength, and freedom from infirmity and disease. So that practically every individual lost from an army means the loss of a man of better physical condition than that possessed by one or more men left behind in the civil population. For the actual figures of present-day recruitment in the great European states show that of the men gathered by conscription as in France and Germany, or by voluntary enlistment as in Great Britain, from thirty to fifty per cent. are rejected by the examining boards as unfit for service because of undersize, infirmities, or disease.

For example, in the decade 1893-1902 out of a total 679,703 men offering themselves for enlistment in England, 34.6 per cent. were rejected as unfit for service, .9 per cent. were rejected after three months' provisional acceptance, and 2.1 per cent. were discharged as invalids within two years, making thus a total of 40 per cent. of all those applying that were turned back into the civil population as not physically fit men. Last year

(1911), of the 64,538 men who offered themselves for enlistment in England, Scotland and Wales, 28,900 or 44.78 per cent. were rejected for physical unfitness by the examining board.

And these figures by no means reveal the closeness of this selection, for the requirements of height and chest measurements are so well known that men obviously under size or obviously infirm do not offer themselves, or if they do are at once rejected by the recruiting sergeants, so that they never reach the regular examining boards. Evidence presented to the Inter-Departmental Committee on Physical Deterioration in the United Kingdom indicates that out of every one hundred men who offer to enlist in the British Army only forty are accepted, sixty being returned to the civil population as physically unfit. And although it may be objected that the flower of the British working classes do not offer themselves for enlistment, yet it is admittedly true that the British Army is not composed exclusively, nor, indeed, by any means, largely of British riff-raff.

This possible criticism of the shunning of the Army by the better classes of young men can at any rate have no bearing in the case of the French and German conditions, where compulsory service obtains. In these countries the whole body of young men arriving at military age each year is liable to service, a certain proportion from it being chosen by lot to join the colours. For nearly a hundred years now France has regularly rejected as physically unfit, from 30 to 40 per cent. of those examined each year. Prussia rejects from 35 to 40 per cent. (This is, of course, I should mention in passing, no basis of comparison between the male youth of France and that of Prussia, for any slight difference in the requirements as to height or bodily condition, or in the rigor of applying the recruiting regulations, would account for the differences in proportion of rejected.)

The point of all that I am now saying is simply that military selection occurs chiefly before the fighting ever begins, and results in the temporary or permanent removal from the general population of a special part of it, and the deliberate exposure of this part to death and disease, disease that may have a repercussion on the welfare of the whole population to a possibly much greater degree than apparent at first glance. And this part of the people, so removed and injured, is in quite a special way a part of great importance to the preservation of the racial integrity of the population. For in the first place it is composed exclusively of men, its removal thus tending to disturb the sex equilibrium of the population, and to prevent normal and advantageous sexual selection. Next, these men are both all of the age of greatest life expectancy, after reaching maturity, and of greatest sexual vigor and fecundity. Finally, they are all men, none of whom fall below and most of them exceed a certain desirable standard of physical vigor and freedom from infirmity and disease. And for each of these men so removed from the general population, at least one other man, falling below this standard, has been retained in the civil population.

The removal is effective even when the individuals are not all killed or injured, for during their time of service all these sturdy young men have no part in the racial propagation. And although after the required years of service they may, if returned alive, take up their part in this eugenic function, much of their value in this function has been lost, not only by the inevitable preoccupation of their place for a certain number of years by inferior men, but by a dangerous degeneration of many of them, as I shall point out later, acquired while in service.

If one is inclined hastily to consider the number of men engaged in military service as so small as to be practically negligible in estimating the influences tending toward racial modification of a population, let him recall the fact that the French and German armies of to-day on peace footings number each more than half a million men in actual service. Germany's total by her new law, effective in October of this year, will be 705,000 men. These numbers are more than 1 per cent. of the whole population of the two countries, and, which is more to the point, more than 5 per cent. of each country's men between the ages of 18 and 35. France now takes annually into military service two out of three of all her young men arriving each year at military age. There have been, of course, times in her history when she has had to take all of these young men who could possibly carry arms. Napoleon's grim remark apropos the question of his personal riches: "J'ai cent mille hommes de rente" (I have an income of 100,000 men), was the truth. And he lived up to his income.

Let him, inclined to see in the removal of a selected 5 per cent. of the men of reproducing age from a given population, no serious influence on the racial modification of that population, recall the fact of the increase by geometrical progression of the characteristics of any given type in the population, so that if one type starts with ever so slight an advantage in numbers, its preponderance over other types increases very swifty. For example, Ammon has shown that if of two types in a population one has an average birth-rate of 3.3 and the other a birth-rate of but one-tenth more, namely, 3.4, the second type will, in only $23\frac{1}{2}$ generations, be double the number of the other in the mixed population.

We may ask now if there is any direct evidence of the racially disadvantageous working of military selection. Seeck describes the difficulties experienced by the Roman Emperors in refilling their emptied armies with efficient Roman soldiers, because of the actual lack, after a long period of continuous war, of able-bodied citizen youth. Rome, in maintaining an army of about 350,000 men, required an annual recruitment of nearly half that number. The time came, however, when actually not more than 10,000 suitable men of Roman citizenship could be raised each year. Seeck finds the reason

for this not in any actual reduction of numbers in the Roman Empire, but in the race-deteriorating results of continued war through the removal from the population by military selection of its best male reproducing element.

Napoleon's difficulties in the later years of the Wars of the Empire were the parallel of the earlier Roman conditions. In order to make his conscription net gather its necessary load of doomed men he first had to reduce, in 1799, the minimum height of conscripts fit for service which had been established by Louis XIV. in 1701 at 1624 m.m., and had remained unchanged for a century, to 1598 m.m. (an inch lower). In 1804 he lowered it two inches further, namely, to 1544 m.m., a total of three inches below the original standard. It remained at this figure until the restoration, when (1818) it was raised by one inch and a quarter, that is, to 1570 m.m. Napoleon had also to reduce the figure of minimum military age.

Guerrini has shown that the mortality of German children between three and five years of age born in 1870 and 1871 was higher than the corresponding mortality of children born in 1869 and 1872. For Prussia, for example, the numbers per one hundred are: 1869, 31.51; 1870, 33.83; 1871, 35.12; 1872, 32.76.

The mortality tables of France show that there has been a steady decrease since 1800 in the death-rate of children under five years with the exception of one period. In the decade 1815-1824, immediately following the terrible man-draining wars of the Revolution and Empire, the annual death-rate of children under five was higher by $1\frac{1}{2}$ per cent. than the highest other period.

But the most conspicuous and definite example, so far determined, of race-deterioration through rigorous military selection and race-reparation by reason of an amelioration of its rigor, is that of the fluctuation in the height of Frenchmen during the past century. A good many unconsidered statements as well as a good many rather overdriven criticisms have been made concerning this matter, and I regret that the limits of my time prevent me from discussing it with the detail that its importance justifies. But if my statements seem cursory, they are, at least, based on a careful and, I hope, impartial consideration of the data available. In a fuller paper, now in course of preparation, I hope to present more satisfactorily elsewhere the details of this study.

The French Government has kept, since the beginning of the last century, detailed figures of height and freedom from or presence of infirmities in the case of all the conscripts examined by its Army boards. From these figures (not all published, but all of which have been made available) the number of men examined out of each annual contingent of men reaching military age, and of men accepted for service and of men rejected because of undersize or bodily infirmity, and therefore the varying proportion of physically unfit to physically fit men arriving at the age of 20 in the successive years of the century, can be determined.

From these figures it may be stated with confidence that the average height of the men of France began notably to decrease with the coming of age, in 1813 and on, of the young men born in the years of the Revolutionary Wars (1792-1802), and that it continued to decrease in the following years with the coming of age of the youths born during the Wars of the Empire. Soon after the cessation of these terrible man-draining wars, for the maintenance of which a great part of the able-bodied male population of France had been withdrawn from their families and the duties of reproduction, and much of this part actually sacrificed, a new type of boys began to be born, boys indeed that had in them an inheritance of stature that carried them, by the time of their coming of age in the later 1830's and 1840's to a height one inch greater than that of the earlier generations born in war time. The average height of the annual conscription contingents born during the Napoleonic Wars was about 1625 m.m.; of those born after the Wars it was about 1655 m.m.

This fluctuation in height of the young men of France had as obvious result a steady increase and later decrease in the numbers of conscripts exempted in successive years from military service because of undersize. Immediately after the Restoration, when the minimum height standard was raised from 1544 m.m. to 1570 m.m., certain French departments were quite unable to complete the number of men which they ought to furnish as young soldiers of sufficient height and vigor according to the proportion of their population.

Running nearly parallel with the fluctuation in number of exemptions for undersize is the fluctuation in number of exemptions for infirmities. These exemptions increased by one-third in 20 years. Exemptions for undersize and infirmities together nearly doubled in number. But the lessening again of the figure of exemptions for infirmities was not so easily accomplished as was that of the figure for undersize. The influence of the Napoleonic Wars was felt by the nation, and revealed by its recruiting statistics, for a far longer time in its aspect of producing a racial deterioration as to vigor than in its aspect of producing a lessening of stature. And the importance in war, or in anything else, of vigor and capacity over size has been well shown us in late years by the Japanese.

I must beg your indulgence again for attempting to content you, or myself, with these fleeting generalizations on a subject at once so important and so needful of careful analysis and judgment as this matter of the explicit and quantitative determination of the immediate race-modifying influence of the Napoleonic Wars. And I shall not even touch the suggestive, although even more difficult, subject of the race-modifying influence of other great wars, to be sought for in Germany, Austria, Italy, and elsewhere. On the basis of the Italian data, indeed, Livi has attempted to show the absence of any disadvantageous working of military selection, but from his own statistics I gain a different belief. While he seems able to

deny the results that might be expected in certain of the northern departments as compared with each other, his figures tell a different story for North Italy as a whole. There a quantitative race-deterioration in certain critical periods is demonstrable.

In Saxony there are plain figures to show the increase in necessary military exemptions in the classes of certain years following, by 20 years' periods of serious war. And also, if less plainly, in Prussia. The evidence regarding the results of the short but severe Franco-Prussian War of 1870-71 is going to be, when worked out in detail, of much interest. In France the results seem to be plain as to an increase in the classes of 1891-92 of exemptions for undersize but not for infirmities. However, the whole subject is very complex. The possible race-modifying results of variations in crop conditions and general prosperity, in industrial changes and in emigration, etc., have to be kept ever in the investigator's mind. As also the apparent possibility always of an actual racial advantage from the selective influence of a short, swift war which may serve to go no further in its destructiveness than to weed out the weaker from the armies and to return fairly intact the stronger after only a short absence from home.

But I have one other and final aspect of the dysgenic influence of war to touch, which if I am to get to at all within my time I must take up at once. It is an aspect that has especially attracted my interest recently, and which does not seem to have been much emphasized heretofore. It is the relation of war to human disease, and particularly to a special type of disease, whose results are, above all else, directly race-deteriorating in effect. I do not mean to say that the special danger from disease to men in military service has been overlooked by students of public hygiene or by the advocates of peace. I mean that no particular stress seems to have been put so far on the immediately race-degenerating influence of some of this disease. But first a few words as to the correlation of military service and disease in general.

In times of war disease has always reaped a far greater harvest of deaths and permanent bodily breakdown in the army than have the bullets and bayonets of battle. The twenty per cent. of mortality by gun fire in such bloody affairs as Austerlitz and Wagram, Moscow, Lützen, Magenta, Solferino, and Waterloo was increased by disease in the same campaigns to the appalling proportion of 60 and even to 70 per cent. In the terrible 20-year stretch of the Napoleonic campaigns the British Army had an average annual ratio of mortality from all causes of 56.21 per 1,000 men; the mortality from disease was 49.61 per 1,000, leaving the direct losses from gunfire to be only 7.60 per 1,000. The British losses in the Crimea in $2\frac{1}{2}$ years were 3 per cent. by gunfire and 20 per cent. by disease.

And this is the story of war from the earliest days even up to the very present. Fortunately, there has been a fairly steady decline in the relative

figures of loss by disease as we read the story from past to present days. But there has occurred so far but a single radical exception to the general rule; this is, of course, the record of the Japanese armies in the Russo-Japanese war. My own enlightened country lost, proportionately, many more soldiers in its last war, a few years ago, among those that never got within sight of the enemy than among those who had the opportunity of charging up San Juan Hill. And all these military losses by disease in war times are, in proportion, it is needless to say, far in excess of the losses that occur at the same time in the civil population.

Even in times of peace, despite the fact that soldiers are cared for under conditions that should make disease among them more easily prevented and more easily controlled than in the case of the bulk of the civil population, and despite the fact that the men in military service have already passed a selective test, which weeded out from among them all individuals already tainted by obvious organic and constitutional disease, it has not arrived until the years of the present decade to break the long enduring rule of a higher mortality in peace time in the military than in the civil population.

In the first decade after the Restoration the mortality from disease in the French army at home was barely less than twice that among men of the same age in the civil population. At the middle of the last century the mortality among the armies on peace footing in France, Prussia, and England, was almost exactly 50 per cent. greater than among the civil population. When parts of the armies were serving abroad, especially if in the tropics, the mortality was greatly increased. For example, among the British troops serving abroad, outside of the tropics, the mortality was one-third more than in the army at home; when serving in the tropics it was four times as great. Finally, in addition to all this actual high mortality among this military part of the population, a part specially selected for full stature, vigour, and freedom from infirmity, we must remember the constant invaliding home of the broken down men to join the civil population. From the eugenic point of view this may be the most serious feature of disease in armies.

However, we must not forget that at the present day things are vastly improved as regards disease in military service. In 1909 the mortality in the British Army, both at home and abroad, was actually slightly less than that among men of the same age in England and Wales. We should think, indeed, that it should be so, and we may hope and expect it to continue so. Yet the statistics collated in 1887 by Robert Lawson, Inspector-General of Hospitals, in regard to consumption in the Army and in the civil population from 1873 to 1884, show throughout this time a greater proportion of deaths from phthisis in the Army than among men of the same age in the civil population, although this proportion changed from

nearly two to one in 1877 to three to two in 1884. But it is probable that the disproportion is by no means yet overcome, or reversed, as it really should be.

An interesting record also is that for typhoid fever in the French army, a record which has been carefully worked out by Dr. Brouardel for a special French Commission on military hygiene. The mean annual strength of the French Army in France, Algeria and Tunis in the 13-year period, 1872-1884, was 413,493 men, with mean annual deaths from typhoid of 1,357, and mean annual cases 11,640, or one typhoid case to every 36 soldiers! Since the '70's and '80's, however, there has been a rapid lowering both of typhoid cases and deaths, the annual number of deaths per 10,000 men having been reduced from 32.1 in the five-year period, 1876-1880, to 8.7 in the five-year period, 1896-1900. And in 1901 there were but 5.7 deaths per 10,000. This result comes from the lessening of the number of cases and not from a lower proportion of deaths to cases, this ratio having remained at about 12 per cent. from 1870 to 1900. The loss from typhoid is now no greater in the Army than among the men of similar age in the civil population of France.

But the actual dysgenic importance of the diseases fostered and diffused by military service, though certainly real, is mostly hard to get at in any quantitative way. The problem of the inheritance of disease, or of the inheritance of the diathesis of disease, is only in the last few years coming to receive the scientific elucidation necessary to its proper consideration from the eugenic point of view. Concerning the congenital transmission and eugenic importance of one terrible disease, however, and one that more than any single other is characteristic of military service, there is no shadow of doubt. It is a disease communicable by husband to wife, by mother to children, and by children to their children. It is a disease that causes more suffering and disaster than phthisis or cancer. It is a disease accompanied by a dread cloud of other ills that it causes, such as paralysis, malformations, congenital blindness, idiocy and insanity, all of them particularly dysgenic in character. It is a disease that renders marriage an abomination and child-bearing a social danger. And as a crowning misfortune this disease does not kill but only ruins its victims. While phthisis and cancer carry off their subjects at the rate, in England to-day, of 1,000 per year to each 1,000,000 of population, syphilis kills but one person a million. It is then not a purifying but wholly a contaminating disease. It does not select by death.

I have called syphilis, and I may include with it the rest of venereal disease, a scourge fostered especially by militarism. It is the cause of more hospital admissions among soldiers than any other disease. It caused 31.8 per cent. of the total military inefficiency in the British army in 1910. It was the cause of one-fifth of all the military hospital admissions for that year, yet it caused but 1-100th of the total military deaths.

And it is only in very recent years that the scourge has been no worse than it now is. In 1895 the admissions to hospital for venereal disease in the British Army in India reached the enormous proportion of 537 per 1,000 men. I hasten to add that this frightful condition has been greatly ameliorated.

Nor is the British Army by any means the greatest sufferer from the scourge. The army of the United States has twice as many hospital admissions for this same cause. Russia has about the same as Great Britain, Austria and France less and Germany least of all. Germany, indeed, has done much more to control the disease than any other great nation, unless it be Japan, for which I have not been able to get data.

As syphilis is not a notifiable disease in Great Britain—it certainly ought to be—it is impossible to state its proportions of abundance in the civil population, but this fact is most suggestive! Of the young men who offered themselves for enlistment in the British Army in 1910 1½ per 10,000 were rejected because of syphilis, while for the same year in the Army 230 per 10,000 were admitted to hospital with syphilis. And for all venereal disease the proportion was 31½ per 10,000 of those applying for enlistment rejected, and 1,000 per 10,000 of those in the Army admitted to hospital. In other words, while the Army recruiting boards discover in the civil population and reject back into it but one and a half syphilitic men and 30 others suffering from gonorrhœa and soft chancre per 10,000, the Army finds within itself a constant proportion of attainted men of many times that number. It is, indeed, a very breeding ground of the most dysgenic of human diseases. The public does not recognize, as a recent editorial in the *Lancet* emphasizes, the vast importance to the community of the prevention of venereal disease. The effect of gonorrhœa in causing sterility and chronic invalidism in women is only now beginning to be understood, while we are ever finding more and wider extensions of the activity of the syphilitic poison.

My time is finished. I have made but the most fleeting survey of my field. But has this survey not suggested to you the need of attention from students and propagandists of eugenics to the dysgenic aspect of militarism?

EUGENICS IN PARTY ORGANISATION.

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The fundamental thesis of my sociological theory is that an iron law leads to the formation of an oligarchy in all political parties, regardless of the nature of the doctrines they profess, whether monarchic, aristocratic, or democratic. To the illustration and scientific establishment of this law I devoted a very large part of my last volume about the Essence of Party Life in Modern Democracy(1). I found in party life a threefold root of oligarchy; the first in individual psychology, the second in the psychology of the crowd, the third in the social neccessity of party organisation.

Under the first of these I group the individual's consciousness of his own importance, which with opportunity develops into the natural human lust for power, and, further, such individual qualities as native tact, editorial ability, and so on. Crowd psychology is characterized chiefly by the incompetence of the masses, their dependence upon traditional methods of party government and their feeling of gratitude to leaders who have suffered for the cause. Finally, the necessity for party organization grows with every increase of numbers and extension of functions. It is physically impossible for large party groups to govern themselves directly. All parties live in a state of perpetual warfare with opposing parties and, if they are revolutionary in character, with the existing social order itself. Tactical considerations, therefore, and above all the necessity of maintaining a condition of military preparedness, strengthen the hands of the controlling clique within the party.

Party leadership, basing itself upon these three tendencies, may at first be spontaneous and easily susceptible of changes in personnel. With enlarged numbers, however, the early loose leadership is superseded by professional direction. Soon the professional leaders become bureaucratic, masters of routine, and, in that way, superior in political education to their predecessors. Anyhow, from professional leadership the step to irremovable leadership is a short one, and with the stability thus attained the oligarchy is fairly developed. And with power once concentrated, party leadership, even that of socialistic groups, becomes cautious, conservative, intent above all to preserve its strength undiminished, and, if possible, to increase it. Besides, corresponding to Marx's principle of the concentration of capital, one can present the principle that with the increase of

(1) In German: *Zur Soziologie des Parteiwesens*, Leipzig, 1911, Klinkhardt; in Italian, corrected and amplified *La Sociologia del Partito Politico*, Torino, 1912, Unione Tip Ed. Tor.; in French, *Le Parti Politique*, Paris, 1912, Flammarion.

tasks in party life the concentration of power in political parties is augmenting.

All party struggles resolve themselves into struggles between the dominating party oligarchy and other equally narrow party oligarchies striving to possess themselves of sovereignty. The dominant oligarchs are sometimes (though very rarely) thrown out of power in a body, when strong opposition culminates in conquering the masses. More frequently, however, the dominant oligarchy slowly liberates itself of its own enemies in the party, by letting down the bars to the leaders of the opposition, who quickly get sobered by responsibility and, having tasted power as party leaders, are quite as determined to retain it by all means as any of their predecessors in office. In either event there is no escaping the conclusion that both in the State and in party management oligarchy is inevitable. At some future time the socialists may possibly be successful, but socialism never.

In the initial period of the labour movement, the basis of political leadership consists above all, though not exclusively, in the oratorical gift. No crowd can resist the power, æsthetic and emotional, of the spoken word. The beauty of the speech moves the crowd, and this suggestion subjects it to, and gives it wholly into the hands of, the orator. It is in the nature of democracy, so far as it aims at exciting sentiments, feelings and actions emanating directly or indirectly from the collectivity, that the word, written or spoken, exercises a great political repercussion on the people. In every democratic régime the leaders are orators and emphatic newspaper-writers. In France: Gambetta, Clémenceau; in England, Gladstone; in Italy: Crispi, Luzzatti. In democratically ruled States, among the qualities which enable a man to rise to the leadership of public affairs, the first place is assigned to oratorical ability, adroitness, and versatility. The same may be sustained, even in a still higher degree, of the party life. Carlyle said: No British man can attain to be a statesman or chief of workers till he has first proved himself a chief of talkers(1). For England, the susceptibility of the crowd to oratorical effects has already been noticed in 1826 by an Italian observer: The English people, so sensible, so sparing of their time, will stop to listen to any man speaking in public, with as much pleasure as they go to hear the best actors(2). In France, Ernest Charles ascertained, on the authority of professional statistics of the members of the Parliament, that nearly all the representatives of the young, active, lively, and progressive parties in the House, are well-known journalists and clever orators; that

(1) Thomas Carlyle, *Latter Day Pamphlets*, n. V: *Stump-Orator*, pag. 167, in *Thomas Carlyle's Works* ("The Standard Edition," Vol. III., London, Chapman and Hall, 1906).

(2) Giuseppe Pecchio, *Un'Elezione di Membri del Parlamento in Inghilterra*, Lugano, pag. 109, 1826.

fact concerns in the same way Socialists, Nationalists, and Anti-Semites(1). The story of the modern labour movement confirms this statement: Jaurès, Guesde, Lagardelle, Hervé, Bebel, Turati, Labriola, Ferri, Ramsay Macdonald, Troelstra, Henriette Roland Holst, Vandervelde, Adler, Daszynski are all very powerful and tremendous orators. On the other hand, the same movements show us that most of the men who, though possessed of the best intellectual and moral gifts, are lacking in oratorical art, never succeed in having a preponderant part in the guidance of the Party. Young men who are preparing themselves for leadership of the crowd know fairly well the value and the importance of oratory. The students of Ruskin College, a few years ago, deserted the lectures only because their professors gave, according to them, too much weight to the study of sociology and pure logic in comparison to oratorical and debating exercises.

We may also notice that the orator constitutes not only a psychological, but also a physiological type. The voice, even the anatomical structure of the mouth and neighbouring part are important co-efficients of the formation of a public speaker; in that way one can affirm that there is an anthropological type; the *born orator* which the successor of Cesare Lombroso at Turin University has recently very carefully described and analized(2).

In peoples possessing a high degree of æsthetic gifts, and living in old and beautiful cities where they are always surrounded by immortal works of art, one of the best of the factors which predispose for political leadership consists in the oratorial gift, accompanied by physical handsomeness. In Italy, for instance, the heads of the socialist parties must be beautiful models of mankind and the best specimens of the race of the country. And so they are: Enrico Ferri and Camillo Prampolini are very fine types of humanity. Of the 33 deputies of the socialist faction of the Italian Parliament in 1902 at least sixteen were above the medium as regards appearance.

Certainly the personal qualities in virtue of which some individuals succeed in raising themselves above the mass of their party comrades in political life, and which must be considered as specific qualities of leaders, are of a complex nature, though it is not necessary that they should all and always be united in the same person. Firstly, energy of will which enables them to dominate weaker characters; secondly, superiority of knowledge which compels respect; "catonian" depth of conviction, a force of ideas which often borders on fanaticism and which, from its intensity, commands the admiration of followers; self-confidence pushed even to the point of

(1) J. Ernest-Charles, *Les Lettrés du Parlement,* in the "Revue," XXXIX., pag. 361, 1901.

(2) M. L. Patrizi, *L'Oratore. Saggio Sperimentale,* Milan, 1912, Treves.

self-conceit, which has the power, however, of being communicated to the mass; in certain rarer cases, finally, goodness of heart and disinterestedness, qualities which remind the crowd of the figure of Jesus Christ, and which reawaken in them those religious sentiments which are not extinct but only weakened.

Concluding, it would not be inopportune to say that these elements of the crowd which succeed in elevating themselves above their fellow-citizens, and in becoming leaders of the party, are the very superior and better elements, not always surely in the moral sense—because party leadership often deteriorates the moral qualities of the man, as I minutely described in my above-mentioned book on sociology(1)—but in an energetic, an intellectual, and, to a certain extent, also a physical way. Indeed, as we have briefly explained in this paper, it is true that the real independence of the democratic chief from the mass on which he theoretically depends, to the point even of being at any moment liable to be dismissed by it, independence which inverts the terms and renders the leader, originally a servant of the mass, absolute master of it, is owing in great part to an always increasing necessity of the division of labour and differentiation of party work, which accentuates more and more the competence of the leader on the one hand, and the incompetence of the followers on the other. The cause, in ultimate analysis, of the predominance of the leaders in party life is based, then, on the conditions of party organisation as a whole, and consists in a professional and educational superiority. To reach this competence it is, however, requisite there be men who can prove themselves to possess certain dynamic and pre-eminent qualities.

Thus we may sustain the thesis: Without party organisation many socially useful elements would be lost, in the sense that they would never change their social class, and remain all their life long in the proletariat; in other terms, they would have no occasion to improve their standard of life and develop the special gifts which enabled them to help the people. Because there is no doubt that modern capitalism renders the rising of the best forces within the working class to economic independence and individual wealth increasingly difficult. In the past, especially during the youth of the new factory system, some of the most clever and most ambitious workmen succeeded, by virtue of an indefatigable activity and, of course, a good deal of luck, in becoming employers. To-day the accumulation of industrial property and the increasing cost of even the most elementary instruments of labour indispensable to industrial management prevent, in all the old countries, such a transformation taking place. The type of the so-called self-made man is, so far as concerns industry, a rather rare and old-fashioned one; only in young countries, like the two Americas and Australia, will it be easy to find a greater number of

(1) *Zur Soziologie des Parteiwesens*, pag. 193n.

specimens of this type. In old Europe it became just a prehistoric figure. It is but natural that intellectually gifted men among industrial wage-earners are looking to obtain a compensation for that lost paradise of their dreams. There are plenty of working-men who feel with real bitterness that their intellectual gifts are slowly spoilt and laid under an arrest by more or less idiotic and boring manual work, without any hope of escape or of the attainment of a better standard of living. All these elements consider party organisation with its *places* and its *careers* as a very anchor of salvation, especially in countries where the political bodies of the working class, the social democratic parties, are well developed, as in Germany, Austria, Switzerland, and to a less extent, in France and Italy (and, as recently appears, in England) and where the concurrence in leadership by men of the educated class, which invades all party life, is not too heavy. It is rather difficult to tell how many proletarians are entered as employees in party movements. In the socialist, the radical, and the catholic parties of the continent their number will not be easy to count. Everywhere ex-workmen contend for the greatest honours and the most eminent places in party life with the *bourgeois-born* lawyers and professors. As union officers they dominate the field without competition. All these men have definitely left their original class, and enjoy social and economic conditions which resemble very closely those of the middle class people. They are *self-made men in politics*.

It may be objected that it constitutes no factor of selection that many of the best elements of the lower classes, attracted by party organisation and the machinery of trades unionism, abandon their original class, in order to be entrusted by the crowd with the business of leadership; that it is a social evil, in the first place, because the socialist and trades union leader accomplishes, as a rule (as we might say according to the conservatives), a function of intellectual distress and social perniciousness; in the second place, because in that way the working class loses its best men, and industry is deprived of its most intelligent hands. We may answer these objections by stating that, first of all, whatever be the number of party and trades union leaders, this number cannot be so high as to seriously weaken the *élite* of working-men who pass their whole life in the machinery halls. On the other hand it seems to us sure that the activity is dedicated by the labour leaders, in a very high degree, to an aim of social selection. Certainly socialism and trades unionism are traced on lines which may be considered as an immense self-defence of the weak against the strong. But the thorough amelioration of the general condition of labour does not in any way mean, nor lead to, the artificial protection of the inferiors against the superiors. To-day the terms inferior and superior have acquired a mere economic character. The actual basis of the struggle for life consists in the conjunction of intellectual and physical gifts with the casual fact of birth, that is to say, a definite economical

milieu. In other words, there is no real selection possible, the richest being necessarily at the top of the tree and having primarily *jeu gagné* in life even if not really superiors by physical strength and intellectual power; the poor being condemned to remain so, even if from every point of view, except the economic, they are superior, *per se*. Therefore every means which betters the general conditions of the lower classes will enable them to measure the strength of the individuals who compose them with that of the well-born classes, and will put the struggle for life on a more healthy and more natural basis, and allow a greater quantity of men to occupy in society the place to which their special and inborn qualities and their cleverness and energy give them a kind of moral and logical right.

THE INFLUENCE OF RACE ON HISTORY.

By W. C. D. and C. D. WHETHAM.

The history of mankind is the tale of the rise and fall of successive peoples, and with them, of their particular form of civilization and specialized variety of religion. As far back as we possess records, and beyond again into eras which can only be revealed by the spade and the pickaxe, or through the interpretation of legend and heroic song, we find this process at work. In the far distance, the alternations of prosperity, quiescence and decadence seem to succeeed each other rapidly enough. We scarcely realize the centuries that passed between the achievements of the IV., XII. and XVIII. dynasties in Egypt, nor the extent to which each of these periods represented the triumph of a fresh method of government, the heroic or personal, the feudal, the hieratic or bureaucratic, a sequence of frequent occurrence in the history of nations. When we come farther down the cycle of centuries, the glory of Greece and Rome seem to occupy a greater space, and the comparative transitoriness of their golden age is apt to be forgotten in admiration of their accomplishments in art, philosophy, law, and administration. Nevertheless the annals of their decline and fall have also been written. It is only when we come to our own time that we are less well able to recognize the process at work, and find it unpleasing to ask on which incline of the advancing wave front we find ourselves placed.

It is interesting to recall that there are certain regions of the earth's surface which apparently do not possess any vivid consecutive history of their own, while again there are others which are never free for long together from dramatic movement and display. The valley of the Tigris and Euphrates in ancient days, Egypt throughout all the ages, and Italy for the past three thousand years are instances of lands that are never long free from turmoil and strife. Again there are other districts, such

as the central plateau of Arabia, the north of Africa, the Steppes of Russia and Central Asia, which appear to have no striking sequence of events in their internal history, and yet have much influenced other lands. History for them is the tale, often a transient one, either of a few sporadic outbursts of their inhabitants over surrounding countries, altering the relationships of the adjacent populations, or of the passing sway and temporary settlement among them of men from some civilisation, external and foreign to their own. A very small part of the earth's surface has contributed an overwhelming share to the making of history, as now known to us.

The cause of this limitation must be sought principally in the study of geographical conditions, and it is not unlikely that the phenomenon could be analysed into a mere matter of mountain or plain, of extended pasture land or indented coast line, of rainfall and water supply. As long as men are engaged in a losing, or at best, a drawn battle with Nature, we have little record of the struggle. Districts which will only support a nomad population do not advance far in the scale of civilization. But selection there is severe and ruthless, and, when such a population breaks out from its bounds, it has all the qualities of hardihood, the instincts of self-preservation, the intolerance of alien or weaker stocks, which have been necessary to maintain its existence. It is in the regions where Nature is most tractable, most kindly, yields best to appropriate treatment that history begins in the triumphs of man's ingenuity over the natural obstacles with which he finds himself surrounded, and in the contests of men for the favoured spots of the earth.

It is probable that some, at least, of the great movements of population in the past have been caused by a gradual alteration of climate, a secular variation in rainfall, which, at times, have slowly changed vast tracts of country from a history-making area to a region of wandering tribes, whose past, present and future merge into centuries of unrecorded existence. Such an alteration would mean the exodus of a large proportion of the population to find a settlement in more fertile lands.

Again, the stages of man's gradual mastery over his environment must be considered among the factors that change the character of history. The cultivation of cereals, requiring tracts of moist or irrigated country, the domestication of the horse, cow, and camel, the invention alike of the rowing boat, the sailing ship, and the steam engine, are all epochs in history. But none of these inventions remains long the exclusive property of the people who may claim the original achievement. Such advances are almost at once at the disposal of anyone who can profit by them. They become part of the heritage of mankind, and are perhaps more of the nature of a change in the setting of the drama, a shift in the stage properties, than a piece of the history itself.

If we consider history in its usual and more limited sense, we find we are dealing with societies in a state of change. Something, usually some

slow, intangible process unrecorded by the chronicler, is constantly occurring in their midst to upset a previous, barely attained internal balance; while constant pressure from other societies external to itself, which are also in a state of flux, adds to the necessity for ceaseless adjustment in external relationships also. In the pages of history, there is probably no such thing as a permanently stable society, although till recently, the Chinese Empire approximated to that condition. Like a bicycle, most social organisms—unless they be of the simplest, patriarchal form that has existed from time immemorial in the deserts of Africa and Asia—require to be in a state of motion in order to retain their equilibrium.

As regards all so-called civilized societies, we know enough from the records of the past, and from our own observation to realize that the changes in the forms of government, which we observe in their progress, are not peculiar to any one nation, and are not of themselves the cause either of advance or decay. The same changes appear in regular sequence in countries that are far apart in space and time. We know that nations have prospered exceedingly under every possible form of government, and the same constitution and structure of society is seldom in force in any one country for many centuries together. These facts again suggest that an alteration is taking place silently in the elements of which a nation is compounded; and that its form of government and its vitality do indeed depend on some variable factor in the quality and quantity of the human lives of which it is composed. What the nature of this alteration may be, and how it occurs, is a subject we shall consider presently.

Human societies consist of a vast number of individuals, all of whom, when viewed at close quarters, are dissimilar from each other. Yet, in some ways, the more distant appearance gives the truer impression, and enables us to group mankind either into families and tribes or social and industrial classes, and then into races and nations. The similarities of body and mind, of interest and purpose, belonging to these divisions are more striking than the differences between the individuals.

While the nation is a political entity in which sufficient isolation has secured a certain homogenity of outlook and action to several different stocks, the family, the tribe and the race are expressions which should always denote consanguinity of blood, and should stand for a physical likeness and a community of ideals, which are innate and inherent. This conception of inborn likeness, due to community of descent, is one that we shall bear in mind in the course of this paper; it forms the true subject of study alike of the ethnologist and of the meeting assembled on this occasion. The industrial divisions, and the political intercourse of nations —communities kept together by mutual economic interdependence and temporary identity of material interests—are best left to the economist and the historian.

The classification of the population of Europe has been a long and chequered undertaking. When the science of ethnology was in its earlier stages, it was difficult to discover what factor could be taken as a criterion of racial similarity and community of origin. Not unnaturally, many of the first workers took language, which presents at once radical differences and striking resemblances, as the specialized character from which to deduce descent and relationship. But language did not prove a safe guide, for people have taken over the speech both of conquered and conquerors. Ultimately, physical characters, such as height, colouring, quality of hair, and the shape of the skull, considered as far as possible altogether, have proved the surest and most consistent guide in determining the racial elements involved. If modern sociologists are insisting also on a fundamental variation of mental qualities, it is important to remember that the size and shape of the skull, which is connected with the form and development of the brain, are some of the most marked characteristics by which races may be distinguished.

The physical characters of the population of Europe have been shown to indicate three principal races. There is a race which, on account of its chief habitat around the inland sea, is known as the Mediterranean race —short of stature, dark of complexion and hair, long skulled, vivacious, gregarious, and, one may perhaps add, at once restless and easy going— the typical Italian, Provençal and Spanish peasant of romance and history. This Mediterranean race has pushed up the coast line of the Atlantic Ocean, following the track of the moist sea-wind, and has made its way through Spain and France into Great Britain and Ireland. In places it remains in a fairly pure condition and has long been recognized under the name of " Iberian " in Ireland, Wales, Cornwall, and parts of the West of Scotland. No doubt, it forms the oldest stratum of the population now clearly discernible in France and the British Isles, though its identification throughout the whole area is not always possible.

The second race is known as the Alpine or Armenoid, and in colouring and stature it is intermediate between the other two. The Alpine race has occupied the hill regions of Central Europe from the Cevennes and the Auvergne in France, through Switzerland and Austria, down into the Balkan peninsula, and across into Asia Minor and the highlands around the sources of the Euphrates and Tigris. The Alpine man is of medium stature, medium colouring, and is best identified by means of his round skull. He is supposed to show tendencies suggesting an Oriental origin, and is usually believed to be the remains of a slow infiltration of population from Central Asia. The precise part played by the Alpine race in the civilization of modern Europe remains yet to be determined.

The third race, the Northern, has long occupied in Europe the country to the south and west of the Baltic Sea. It has stretched away to the South-East, across the grass-lands, till we find its representatives in the

ruling castes of Persia and North India. This Northern race is tall and long skulled; and, in its pure condition, blue eyed and fair haired. We find it in its greatest purity in the Scandinavian peninsulas and around the Dutch and English shores of the North Sea. We may recognize many of its characteristics, its vigour, its loyalty, its determination, its perseverance, its love of adventure in the tales of the Homeric heroes and in the Norse sagas. It has colonized North America and created the United States and Canada; it has descended on South Africa, and occupied Australia and New Zealand with its typical civilization; while the Mediterranean race has found a second home in the Republics of Central and Southern America.

The ancient and modern history of Europe, if we leave out of account the extraneous influence of the Semitic peoples, is probably, at bottom, only the history of the interaction of these three races. The Mediterranean race has multiplied and pressed northwards, gathering itself into towns and cities on its way. The Northern race has always looked across the mountains down into the fertile plains and river valleys of Southern and Western Europe, tempted by the vineyards and the cornfields, the plunder of the towns and the adventures by the way. Doubtless, too, seasons of excessive cold or drought, or pressure on its eastern flank, have driven it afield without any more intent. At times, blending with men of the Alpine race, or passing through their mountain ranges and pushing them up the hillsides, the Northern race has reached the Mediterranean Sea, as a predatory, renovating, directing and conquering force; destined, after a time, to melt away and lose its identity amid the aboriginal native stock, more persistent, more numerous, and more fitted for a southern environment.

Both in ancient Greece and ancient Rome we find distinct traces of the two races, the part played by the Alpine race being as yet less well defined. The admixture of religions, the physical characters, the mental bias, the trend of civilization, all reveal the same story. A conquering race of Northern origin, tall, fair, and often blue eyed, had descended from the hills, possessed itself of the land, monopolized the government, inspired the art and literature, and retained the aboriginal population in a condition of serfdom and dependence. Man, as the ancient Greek philosopher observed some five hundred years before the Christian era, makes his gods in his own image; or, perhaps, more correctly, in the image of the fellow-being he admires and fears most greatly. The divine beings of Greece, as portrayed by their poets and artists, are tall fair haired, and blue or gray eyed. This alone should assure us of the then acknowledged supremacy of the Northern race.

It is impossible at this distance of time to reconstruct the sequence in the numerical and social relations of the two races with sufficient accuracy to enable us to follow the alterations that must have taken place

Probably, at first, the two races kept distinct, each fulfilling its separate mission. But, as the era of conquest passed away and the two settled down side by side, the amount of intercourse between conquerors and conquered, freemen and slaves, would increase gradually, intermarriage become more frequent, political privilege less uneven. Then, at some one period, the nation might attain its greatest prosperity, when a happy balance had been reached between the differentiation of the two stocks—each still fulfilling the rôle for which it was best suited—and the blending process which, without going too far, had achieved a certain outward unity of purpose, and had created, possibly through material prosperity, a definite national spirit. But, at all times, the conquering and directing race is more freely exposed to the changes and chances of this mortal life. As leaders in warfare, adventurers on the open seas, governors and administrators in distant colonies and settlements, a larger relative proportion of the upper element, smaller in number to begin with, would leave their native land, never to return. The selective action of a differential birth-rate, which seems to come into play in each civilization in turn, as the abler members assume a greater and even greater responsibility for the welfare of the inferior stocks of both races, and more of the ineffective elements are kept alive and allowed to reproduce their kind, would also assist in the work of deterioration and decay. Even without either of these two artificial causes, the apparent prepotency of the darker Mediterranean race, probably due to the Mendelian dominance of their characters, would gradually efface the northern characteristics as soon as intermarriage and unchecked social intercourse were permitted throughout the nation.

Towards the end of the classical period, a new flood of Northern peoples descended on the south of Europe. Teutons, Goths, and Franks overran the provinces of the Roman Empire in wave after wave of vigorous, warlike, barbaric hordes. If driven back for a time across the Danube and the Rhine, they returned again and again, led by hope of possessing the fertile plains of the south, or forced forward by the pressure of famine or of Hun. Finally, many areas were settled permanently, with or without the leave of Rome, and thus a new admixture of Northern blood invigorated those peoples from whom arose the earliest nations of modern Europe. As the civilizations of ancient Greece and Rome arose from the effects of the prehistoric influx of Northerners, whose presence can only be inferred from evidence of tradition, archæology and anthropology, so our modern Europe took its rise from the welter of the Dark Ages when this second and historical influx had once more invigorated the southern races, who had lost the stimulating vigour of the first immigration, and had relapsed into chaos when the organising and directing genius of the northern elements in their population had been submerged or eliminated by racial admixture or adverse selection.

Once more we find the most favourable conditions when time has led to a certain homogenity of outlook and interest between the different racial elements, when, in fact, isolation and common political needs have formed a true nation, a nation in which, nevertheless, sufficient diversity of race and class still remains to provide for the different functions and occupations of a civilized people, a nation still containing a large element of the Northern race with its characteristic governing faculty, and spirit of scientific inquiry.

When the racial elements have reached a favourable composition, an external stimulus, such as that of the Renaissance, itself partly the effect of racial powers, is followed at once by an outburst of civilizing energy. Thus, the Italian Renaissance, the first-fruits of the new spirit, has been attributed by Houston Chamberlain to the qualities of the descendants of the northern invaders of the Empire reacting under the stimulus of Italian town life and the legacy of the ancient culture. But it should not be overlooked that the Renaissance began and reached its zenith in lands where the basis of the population was of indigenous southern origin. Provision was then made for the performance of daily routine labour, and this made it possible for directing, literary and scientific ability to be reserved for its true sphere and given its full opportunity.

For some time, in the north of Italy, the conquerors maintained a separate existence, had their own family laws, and only gradually mingled with the general population. But the internecine warfare of the Italian cities, and the gradual disappearance of social barriers reduced the effective force of the northern stock. The celibacy of the Roman clergy and the establishment of the monastic orders would also add their share to the work of biological deterioration.

In Spain also, the rebirth of Western European influences came from the hills, whither the survivors of the West Gothic conquerors had withdrawn themselves at the time of the Moorish invasion. But, before the new movement had reached its zenith, the drain of men of adventure and spirit to the American colonies and the persecutions by the Roman Church—the heir in thought and method of the late Universalist Roman Empire—of the more brilliantly endowed intellects in their midst, brought the Spanish Renaissance to a speedy close.

If Greece and the Balkan peninsula are not to be counted as effective elements in the European Renaissance, we may, perhaps, attribute their failure to the extraordinary mixture of races, Sclavonic, Magyar, Turk, and Levantine, which has now overrun those districts. Not until fusion through intermarriage and subsequent racial segregation has evolved a new homogeneous type, or extermination and decay of some of the incongruous stocks has taken place, does it seem probable that any strong outstanding race, with a definite personality of its own, will arise, who could have power to renew the Hellenic civilization of olden days.

But while we owe the revival of learning and the full glory of the renaissance to southern lands, in modern Europe the more prominent nations seem to be those of the north. Doubtless, many factors have contributed to this result. Change of trade routes, the "accidents" of political and military history, all had their effect. Yet it is possible that a racial question is also involved. When the northern nations came to the front, the northern racial elements in the southern peoples were once again being obliterated, and those nations were thus becoming relatively less effective. Moreover, inventive genius and the consequent growth in material resources were tending to transfer unskilled servile labour, necessary for civilization in the past, from man to machinery. The need of a dependent race was thus becoming less; a larger proportion of men in a nation could be given directive functions, and a type of civilization more suited to nations of more pure-bred northern origin began to develop.

In modern England we have probably a mixture of the same races at the base of our population as there was in ancient Greece and Rome or in the north of Italy of the early Renaissance. The small dark race is found in its greatest purity in parts of Wales, especially in the south, in the west of Ireland, the west of Scotland, and in Cornwall, and parts of the adjacent counties. The great towns also show a tendency to attract a short dark population. The east and north-east of England and the southern districts bordering the sea are the strongholds of the northern race, which has left traces elsewhere in isolated regions round the coast, wherever the northmen and sea rovers could obtain a footing. Taking the population of England in a general sense, the upper classes and the country folk seem, on the whole, to be fairer and taller than the industrial sections of the population; a disposition which may indicate a natural drift of the northern race towards modes of life giving openings for their directing and organizing powers and to their love of a free life in the open air.

From various studies of the distribution of ability and genius throughout the British Isles, Havelock Ellis noticed a tendency to the production of one definite type of ability associated with some particular geographical area, and manifested throughout succeeding centuries. Such a sequence of specialized attainments must evidently depend on the mental characteristics of the families inhabiting the area in question. On the whole, of the constituent countries of the British Isles, it seems that Wales has contributed rather less and Ireland much less than their numerical share of ability, while Scotland has been more prolific than the number of its population warrants. But, again, the Anglo-Irish cross has given a better proportion of ability than the Anglo-Scotch.

The two universities of Oxford and Cambridge, in their earlier days the one drawing students chiefly from the south and west, the other from the north and east, have maintained distinctive schools of learning almost since

their foundation. Cambridge has been the nursing mother of the Anglo-Danish stock, and has turned out a long line of poets, men of science, and mystics. There is, indeed, much truth in the old saying that Cambridge bred the martyrs and Oxford burned them. Oxford has collected men of the Saxon race, intermingled with survivors of the so-called "Celtic" and pre-Roman tribes of England, who were driven into the West, and, in their turn, drove the short, dark Mediterranean stock before them into Wales and Cornwall. The western university has produced the historians and the philosophers, and has always greatly influenced the literature of England. At the present day Oxford is far more largely represented in literature and on the public press of the Empire than Cambridge, while in science, mathematics, medicine, and engineering, Cambridge is easily pre-eminent. Once started on their course, the characteristics of the two Universities have persisted into days when they draw more evenly from all parts of the country.

The two Universities are but the indices of the mental qualities of the different populations they have attracted within their doors. It would appear that there are three principal foci of ability in England; one, in East Anglia, including Lincolnshire and the adjacent counties, of which Isaac Newton is the supreme achievement; a second, in the West, centring round Devon, Somerset, and Wilts, of whom, perhaps, Sir Walter Raleigh, soldier, administrator, courtier, and man of letters, is typical; a third, remarkable for its artistic and literary bent, on the English side of the Welsh borders. It is from these last two areas that in early days Oxford has largely drawn her scholars. Kent, which, like East Anglia, early attained a high state of civilization, partly owing to proximity with the Continent of Europe, also shows a high proportion of realised ability, of the western rather than of the Anglian character. The large towns, including even London, with its immense attractions for the able and ambitious, have no special record in the production of commanding personalities, nor have the great centres of population in the north of England yet added their due quota to the men of distinction among us. The type of population developed in or attracted by the industrial developments of the nineteenth century is apparently not of the kind freely to produce philosophers, statesmen, poets, or men of science.

As we have said before, it is impossible to reconstruct with any certainty the stages by which a fortunate balance first was attained and then overset in the ancient world; but, in modern civilization, there are several tendencies at work which would affect adversely the northern races, that is, if we may accept the evidence which indicates that the upper social strata and the country districts contain a predominant share of northern blood.

Although on the Continent of Europe, in districts where the Northern and Alpine races meet, the Northern element seems to preponderate in the towns, yet there seems no doubt that in England, as between the

Northern and Mediterranean stocks, the short, dark race can more easily adapt itself to a town life. It appears to be more tolerant of industrial conditions, and to be more resistant to the diseases and unwholesome conditions of life that it there encounters. Thus the urbanization of Great Britain, as of the Roman Empire, may be held to favour the Southern stock.

Again, the voluntary restriction of the birth-rate—a well-known phenomenon both in the Greece and Rome at the time of their entrance on the downward grade—which has been in action among us since 1875, made its appearance earlier and to a more marked extent among the more successful and prosperous classes, probably containing a higher proportion of northern blood.

There is, on the whole, a less diminution of birth-rate in many great towns, such as Liverpool and Dublin, where it still stands above 30 per 1,000, than in the country districts surrounding them; and the poorer parts of many towns, containing the shorter, darker elements, hardly show traces of any lowering in the output of children.

It seems probable, then, that these modern tendencies of our civilization favour selectively the racial elements of Southern origin, the elements that, as far as we can ascertain, have been the least productive of men of ability and genius in England. If this be the case, bearing in mind the characteristics of the two races, the British nation and perhaps the nations of Western Europe generally, may find themselves becoming darker, shorter, less able to take and keep an initiative, less steadfast and persistent, and possibly more emotional, whether in government, science, or art.

A gradual alteration of the biological constitution of any nation in the direction we have indicated would have cumulative results, and, in the end, must lead to some shifting of power and influence, both internal and external, to an extent that would certainly be recorded prominently in history.

SOME INTERRELATIONS BETWEEN EUGENICS AND HISTORICAL RESEARCH.

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The eugenics movement, in order to justify itself in the eyes of the body politic, must first of all emphasize heredity; but it must do more than that. It is incumbent on the advocates of eugenics to prove that the desired betterments in the social organism cannot be looked for as a consequence of environment; for, if they can, then why take up a new remedy? Every research in anthropology and history, which shows that nature is stronger

than nurture, adds that much to the eugenist's capital. It is the chief object of the present paper to show that the historical records can be utilized, and when utilized, the answer practically always is to strengthen our belief in the importance of inborn qualities.

It has been sometimes said that it is impossible to separate heredity from environment. It is true that, as far as any one individual is concerned, both the inborn or gametic forces and all the other subsequent influences are hopelessly intertwined. The black-haired and black-eyed negro is as he is—the compound resultant of all forces acting on the production of pigment. A white man is equally the result of all internal causes acting in response to all outward stimuli. But, the pigmentation differences between white and negro, say in the United States to-day, or at any one place or time, are obviously a matter of germ plasm. We scarcely realize that, without the least doubt, we in this instance at once separate the relative value of heredity and environment. Shades of colour may in part be produced by differences in exposure to the rays of the sun, but this does not complicate the question in the least. The differences are due *almost* entirely to heredity and for practical purposes, this covers the ground.

It is true, some data do not permit the separation and evaluaton of heredity; for instance, if the social class which is favoured by fortune, is found to be several inches taller than the dwellers in slums, the observed difference may be due to difference in nourishment, or it may not. There is no way of telling without further investigation. But if the environment for any reason can be known to be identical, or for practical purposes, the same as identical, then the observed differences must be caused by something else. It is always necessary to make these problems problems of differences. It is also important to think of the word heredity not as signifying a resemblance between parent and offspring, but rather as a term covering the gametic or inborn potentialities, all that is present in the single fertilized cell. Mendelian investigation has proved that, for certain traits and in certain definite ratios, no resemblance whatever is to be expected between parent and offspring, yet these offspring show their peculiarities no less certainly as an outgrowth of inborn differences. With some such definition of heredity as this in mind, we may now proceed to see how far the material stored in history, biography, and genealogy lends support to the doctrine of gametic causation.

The labours of the biometricians have placed in the hands of the historian a wealth of analyzed data, pedigrees, and correlation coefficients, bearing on the inheritance of family traits. These mental and physical measurements are not drawn from history. Now, researches historically derived can be compared with these and matched side by side; this has been done, and one finds substantial agreement. This does not in itself prove heredity the cause of the distribution of historical facts, but it does

reveal just the sort of facts that one would find were heredity all that its most ardent advocates believe it to be.

In his pioneer studies, Sir Francis Galton used the materials of history to prove that men of genius count as many eminent relations as the expectations of heredity demand. Mr. Ellis has shown that British genius does not spring from the lower classes; the proportionate number is so small compared to the total of the group (certainly not one to the million) that the few exceptions seem themselves to speak for the inborn nature of their gifts. Higher and higher in the social scale the percentages increase, until, among royalty, the number of geniuses of the first class becomes, instead of one in a million, one in about thirty or forty. No investigations have been made of inheritance of genius among the nobility, but among 832 members of the various royal families at least twenty exhibit a genius in war and government which would entitle them to rank intellectually with those included in the studies of Galton and Ellis. Such a percentage is more than twenty thousand times as high as it is among the masses. And furthermore, all the exceptional geniuses in royalty—men like Frederick the Great, Peter the Great, Maurice of Nassau, and Gustavus Adolphus—are properly related to others of the same class, or to those of lesser eminence, just in the way that gametic inheritance demands. Moreover, correlation measurements have been obtained comparable to those found in the anthropometric laboratory.

But may not all this be equally the result of opportunity? That it is not the result of opportunity is proved by a more detailed analysis of materials. When complete pedigrees can be constructed and information obtained concerning the lives, the achievements and characteristics of whole family groups, the wicked as well as the virtuous, the stupid as well as the brilliant, it becomes evident at once, on examining such charts, that the strongest contrasts are everywhere the rule, even among those close of kin. These contrasts, more than anything else, compel a belief in the inborn nature of their mentalities. A similar environment ought, if it is effective, to mould people towards the same mental pattern. But royalty, historically considered, has not been so moulded. There is no reasonable cause why Frederick the Great was so different from his weak-kneed and almost forgotten ancestor, George William of Brandenburg, except inborn determiners—something in the protoplasm, or, shall we say, something in the chromosomes.

All that we know from modern Mendelian investigation leads us to expect these contrasts. Separately inheritable units are everywhere observed when studying animals and plants. When we study the higher traits we do not find single, simple units that can at once be brought in or immediately eliminated out, but we do discover the same tendency to the segregation of groups of determiners which finds its expression in the technical

phrases, "alternative inheritance," "presence or absence," "particulate inheritance," or "gametic segregation."

Thus, there are two proofs of heredity: First, the correlation ratios give all that is to be expected of heredity; and second, an intensive study of pedigree charts gives more. It gives something which environment can scarcely be thought to have caused.

An objective study of psychological types of morality reveals the strongest contrasts. The historian is at fault who says that such and such a king was no worse than his contemporaries, or was only typical of the age in which he lived. As a matter of fact, every bad king was very much worse than a great many of his contemporaries. Seven of the early kings of England were licentious, but there is equally good authority that eleven of the others were not. If Richard Coeur de Lion was a libertine because of the age in which he lived, what shall we say for William the Conqueror? This noted tyrant, with all his faults, was not in the least a libertine. The early French kings show the same array of differences. Those described as licentious are Charles VI., VII., VIII., and XI., Francis I., Henry III., and Henry IV. Those described as chaste are Louis VI., VII., VIII., and IX., Philip III., and Charles V. And it is worth while to observe, in this instance, the kings who were noted for their chastity all lived in an earlier age than the others. In the history of Castile, Alfonso X., Sancho IV., Ferdinand IV., Alfonso XI., Peter I., and Henry II., and in the history of Aragon, Alfonso I., James I., Peter IV., and John II. are pictured in lurid terms—sinister and merciless tyrants. But, in both these countries, a somewhat greater number were quite the opposite; and there is not the least reason for calling them treacherous, tyrannical, or cruel. Some naturally fall in a doubtful class between these two extremes, and historical evidence is all too meagre at times, but the point is that the sort of report which history gives is just what we should expect from heredity as it is understood to-day, and is perfectly explainable by it.

On the contrary, attempts to measure environment have generally failed. For instance, actual reigning sovereigns have had presumably different opportunities for eminence, compared with their younger brothers; yet the difference in opportunity has made them neither more nor less eminent. It has been shown that court atmosphere—the living for several generations at one court—has not had any measurable effect on the morality or behaviour of princes. That is, any given prince is just as likely to resemble his maternal grandfather and maternal great-grandfather who lived in some foreign court, as he is his paternal ancestors who lived in the same court.

Another illustration which shows a failure of differences in surroundings to produce differences in the end is drawn from a study of American history. It has been claimed that personal distinction in the older civilisations, such as exist to-day in European countries, is much favoured by family patronage. I thought it would be interesting to compare the facts of family distinction

in Europe with the same sort of facts in a democratic country like America, where the social conditions are different, and where opportunity is supposed to be at its maximum. With this idea in view, I have had two graduate students in Harvard University collect historical and genealogical materials—everything that could be brought together concerning the ancestors and descendants of those greatest Americans whose names are in the Hall of Fame, an arcade built on the banks of the Hudson in New York. These celebrities, forty-seven in number, have been elected to this temple of the immortals only some years after their death and after careful deliberation, the names of candidates being voted on by a committee of a hundred, made up of citizens who are themselves distinguished in various walks of life and are supposedly best qualified to pass judgment on such matters. This makes an excellent list to begin with; and any bias I myself may have is eliminated, since the list is prepared by others. I then made a second group of names, about 3,500 in number, by adding together all those in two standard works of biography. Now the chances that an ordinary mortal—any man taken at random—will be closely related (as close as a grandparent or grandson) to any person in this second group (the 3,500 group) is about one in five hundred to perhaps one in a thousand. In contrast to this, fully one-half of those in the Hall of Fame are closely related to someone in the second group, and, if all their distinguished relatives are added up, they average more than one apiece. In other words, the amount of distinguished relationship which the Hall of Fame gives is about a thousand times the random expectation.

In the time allotted, I cannot go into details, but I may say that the whole picture presented by these pedigrees of leading American families is the same as the European. Intellectual distinction is just as much of a family affair in the new country and in a freer atmosphere as it is on this side of the Atlantic, where the social lines are supposed to be more strictly drawn. I do not wish to be understood as saying that environment has not been important to both sets of peoples. Indeed, it has been all important. But I do wish to emphasize that here is a case where, making the question a problem of differences, it is found that a difference in the environment has been incapable of making itself felt.

History, when studied by methods of measurement and viewed over long periods of time, does not make one believe in the plasticity of human nature. There are changes from one age to another; but these seem due to the dropping out of whole characters through failure to transmit, so that the percentage in each generation becomes gradually less. It does not seem due to gradual accumulative moulding power of society as a whole. Some of the later kings are as bad as the earlier, but there are not so many of the bad type. On the average, the worst types have left fewer adult descendants, probably because of strong and wide-reaching correlations between normal health and all that passes under the term morality. Many dynasties,

for one reason or another, have come to an end; but others, equally blue-blooded, have continued to thrive and increase numerically. The survivors are descended from the morally superior, on the average—statistical proof for which I have already published. Morally superior persons are also, it is encouraging to say, those who, on the whole, are superior intellectually, so that history does afford evidence with regard to changes in racial characters of a very optimistic sort.

Historical portraits can also be used in the biological interpretation of history, and physical changes demonstrated coming in the course of generations. A comparative study of the authentic portraits of royal, noble, and other historical personages proves that the bony framework of the face, especially that about the nose and eyes, has rapidly changed since the beginning of the sixteenth century. The eyes are now closer together and more set in, under the supraorbital arch; the upper part of the nose has become more slender and the cheek bones less prominent. The eyebrows of the men and women of the Renaissance frequently spread broadly outward and upward, as in the well-known portraits of Henry VIII. Altogether, the upper part of the face was closer to the Mongolian type in the earlier days. The mouth and lower part of the face appear to have changed but little. I have collected photographic material from several of the large galleries, and have submitted the question to statistical tests. Some specimen photographs are here on exhibition, and I hope soon to publish the scientific proofs. For the present, I shall be content to merely comment briefly on the question. The first thought is that the artists painted them in this peculiar way, and that the paintings are not correct likenesses; but this cannot be the explanation. Authentic portraits prior to the sixteenth century are very rare. The earliest contemporary portrait of an English sovereign is that of Richard II. in Westminster Abbey (last part of the fourteenth century). It has a very conventionalized appearance. From this time until about the close of the fifteenth century, most portraits are, for one reason or another, unsatisfactory; but with the great Italian masters (about the year 1500) a new era commences, and the faces have the appearance of being correctly delineated. But, more than this, the same artists painted portraits both north and south of the Alps. The portraits of the Venetian nobles do not show the characteristics I speak of. The same is true in a general way of all the Italian nobility; but the early portraits of English, French, Flemish, and German nobility are quite different. Here it is very rare to find a face of the modern type, but such are occasionally seen, just as would be the case were all the portraits good likenesses. The whole series of facts is comprehensible only on the supposition that the peculiarities, which are so easy to observe in the painted canvases, are the representation of real anatomical differences.

Already, by the seventeenth century, the peculiar naso-orbital region is less frequently encountered. The artists of the eighteenth century were such

notorious flatterers that their work may best be left out, but the nineteenth century has furnished reliable portraits, and photography comes to our aid. The whole in a nut-shell is this: As a question of proportionate numbers, and in the same grade of society, it is as hard to find a sixteenth century naso-orbital type at the present day as it is to find a modern among the northerners at the time of the Renaissance. It does not seem reasonable that any differences in the environment could cause these differences in relations and proportions of bones of the face. At least to those who deny the inheritance of modifications acquired through the environment, it is hard to understand how the change has been brought about, except by some internal and gametic cause associated with matters of selection and survival. The faces of the early aristocracy seem more like the peasants of to-day. As a tentative hypothesis, I would suggest that an unconscious sexual selection has actually caused this change. When the Renaissance brought a revival in the arts of antiquity, the standards of Greece and Rome became the models for everything, including standards of beauty, and the faces of the north-western Europeans have grown more like the Greeks and Romans—the upper classes, on the average, leading the way. Of course, the doctrine of evolution makes it certain that the human face is not the same now as it was once. If we look far enough back into the past (the stone age, for instance), the face was certainly different; but the interesting point about the portraits is that they show such an astonishingly rapid change. Human nature is not the same throughout all ages, nor do we look like our ancestors of a few generations ago.

There is a fascinating interest in explaining the decline of the great civilizations of the past, and there is always much that is superficial in such explanations from the failure to take into account causes of growth which acted anterior to the beginning of the decline—factors that were at one time present but were afterwards withdrawn; and no factor of such a character is more important to carefully consider than the dynastic factor, and, indeed, the whole aristocratic element of which royalty is but the top and crown. Because Egypt, Assyria, Greece, Rome, Spain, Portugal, and various other European nationalities declined, it is no reason why other nations should follow in the same track. The new or western nations are built upon entirely different foundations. They have evolved in such a way that great masses of people have become elevated and able to govern themselves; whereas the earlier civilizations were dependent for their growth, and indeed for their very life, on a few people who formed an artistocratic class far superor to the masses whom they governed.

This is proved by the fact that prior to the nineteenth century no country with the exception of Great Britain was able to make political and economic progress except under the leadership of a great monarch, or a single great personality—some great statesman who acted as a monarch. I have just completed a research involving several years of study and

covering the history of fourteen countries of Europe; 366 reigns or regencies are included, and not over seven per cent. can be cited as exceptions. In ninty-three per cent. of the cases a single personality is the cause of, not the conditions, but the changes in the conditions from one period to another. The rise and decline of Spain and Portugal, Sweden and Turkey, the cumulative but spasmodic growth of France, the early, slow, but finally accelerating growth of Prussia and Russia, the evanescent importance of the Dutch, the retarded development of Scotland, the comparative negativeness of Austria, the unexpanded state of Denmark, these are all parallelled in the personalities of the leaders. And, furthermore, there is, running through the coarser evidence, finer evidence, which makes it impossible to believe that the conditions caused the differences in the rulers, or that these men were moulded by circumstances. The changes are too sudden for that. There is not more than a minor tendency for the conditions in one reign to influence the next. With the exception of Great Britain (and that since Elizabeth's time only), we may say in a general way, everything depended on the presence or absence of strong leaders—men of genius, themselves the product of combinations within the gametes.

But heredity is not everything, and I will give two illustrations which show the possibilities of separating out environment. Professor E. C. Pickering and myself have recently been measuring the scientific activity in the history of the world, and especially in the natural and exact sciences, by studying the elections to Academies and the inclusion of names in the standard English, French, and German encyclopedias. It appears that the increase in the total number of men engaged in science in Germany during the nineteenth century surpasses the expectations of heredity, and therefore, must be due to something else—something we must call environment. Also, I have unpublished material showing that the proportionate number of women, as compared to men, whose eminence makes them noteworthy, has increased measurably in the United States from the first settlement of the country to the present day.

I believe that the science of historiometry will prove that heredity is everywhere the chief force in determining the fates of nations. Heredity makes the backbone of history and the body of history, but changes in the environment may alter the complexion somewhat. All these questions can be measured and weighed if we make the problems into problems of differences. The mine of historical information is almost unworked. It is high time that the human record, so ancient in its beginnings, should be used to contribute to that most modern of sciences the improvement of the human breed.

CONTRIBUTI DEMOGRAFICI AI PROBLEMI DELL'EUGENICA.

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CAPITOLO I°.

La mortalità durante lo sviluppo nella specie umana e nelle specie animali superiori.

1. Negli scrittori di biologia si incontra spesso l'idea che la mortalità durante lo sviluppo sia tanto minore quanto più la specie è evoluta. La natura—suole dirsi con linguaggio antropomorfico, poco scientifico per vero, ma efficacemente rappresentativo—di mano in mano che andava perfezionando il tipo degli organismi, sentì il bisogno di fare economia di vite: migliaia di uova sono così necessarie per assicurare la riuscita di una rana adulta; i piccoli dell'aquila e del leone pervengono invece, quasi senza eccezione, a maturità.

Se questa regola risultasse bene stabilita per la generalità delle specie, bisognerebbe dire però che essa subisce una notevole eccezione nei riguardi della specie umana in confronto ad alcune specie animali superiori.

Per la specie umana, noi disponiamo di tavole di mortalità per tempi abbastanza recenti, relative a quasi tutti i paesi di Europa e ad alcuni paesi di America, di Asia e di Oceania. La percentuale dei nati, i quali muoiono prima del completo sviluppo, che per l'uomo si può porre a 20 anni, varia dal 55% in India e dal 50% in Ispagna al 22% in Norvegia, Svezia, Danimarca ed Irlanda ed al 21% nell'Australia occidentale.(1)

Per la specie equina, il Caramanzana ha calcolato una tavola di mortalità, secondo la quale, prima dei 4 anni, età in cui il cavallo raggiunge il completo sviluppo, verrebbe a morte non più del 9.4% dei nati(2). Nella specie umana, tale percentuale viene superata già nel primo anno di vita(3). La tavola del Caramanzana è, per vero, calcolata in base a criterii, per quanto ingegnosi, pure molto incerti; ma i dati attendibili ed estesi pubblicati dalla "Società scandinava di assicurazione sul bestiame" fanno pensare che i coefficienti di mortalità indicati dal Caramanzana sieno sufficientemente approssimati e, se mai, troppo elevati (4). Codesti dati si fondano su esperienze decennali relative ai cavalli svedesi e si riferiscono alle età da 1 a 19 anni; manca il coefficiente di mortalità da 0 a 1 anno; se si suppone che da 0 a 1 anno la mortalità sia quale la calcolava il Caramanzana e che da 1 a 4 anni sia quale risulta dalle osservazioni per i cavalli svedesi, converrebbe dire che, nella specie equina, su 10,000 nati, 9257 sopravvivono fino a completo sviluppo.

I dati della "Società scandinava per l'assicurazione del bestiame" si riferiscono certamente a una popolazione equina selezionata; poichè i cavalli assicurati sono certamente meglio curati, in generale, dei non assicurati; in ogni modo però la loro mortalità durante lo sviluppo si mantiene di gran

lunga inferiore anche a quella delle classi umane che vivono nelle condizioni igieniche ed economiche migliori.

I dati seguenti(5). per quanto non recentissimi, fanno pensare che una sopravvivenza del 93-94% ad un anno e dell' 80-85% a 20 anni costituiscano, nella specie umana, un massimo difficilmente superabile:

Tavola I.—*Sopravvivenza dei nati nelle classi elevate della specie umana.*

Sui 1000 nati sopravvivono all'etax.

Età X.	Classi elevate (Ansell 1874)				Pari Inglesi (Bayley & Day) (1861)	Famiglie regnanti di Europa 1841-90 (Sundbärg)
	Religiosi.	Giuristi.	Medici.	Altre Famiglie.		
1	926	920	913	916	930	936
5	886	878	862	864	899	877
10	867	855	837	840	882	—
15	848	839	821	825	—	—
25	785	781	768	768	—	—

D'altra parte, anche i dati per la popolazione generale, che si possono ricavare dai censimenti, confermano, pur nella loro grossolana approssimazione, che, col crescere dell'età, il numero dei viventi diminuisce, nella specie equina, molto meno rapidamente che nella specie umana(6).

2. La mancanza di dati statistici relativi alle altre specie animali superiori, allo stato naturale, lascia luogo principalemente a due ipotesi: o la mortalità delle altre specie animali superiori allo stato naturale è, durante lo sviluppo, analoga a quella che dimostra la specie umana e la scarsa mortalità della specie equina è dovuta alle pratiche eugeniche che si seguono nella riproduzione e nell'allevamento del cavallo domestico: o la mortalità delle altre specie animali superiori allo stato naturale è durante lo sviluppo analoga, se non minore, di quella che mostra il cavallo domestico e l'alta mortalità durante lo sviluppo costituisce, fra le specie animali superiori, una triste prerogativa della specie umana.

Nella prima ipotesi, l'utilità dell'Eugenica sarebbe dimostrata e l'Eugenista potrebbe già pensare a mettere in opera, per migliorare la specie umana, quelle pratiche che sono in uso tra gli allevatori dei cavalli; nella seconda ipotesi, resterebbe anzitutto da decidere se la forte mortalità della specie umana durante lo sviluppo costituisca una sua caratteristica naturale specifica o non rappresenti piuttosto una conseguenza delle condizioni più o meno artificiali in cui, almeno nelle società incivilite, si compie la riproduzione e l'allevamento dell'uomo.

Ora, per quanto la mancanza di dati statistici impedisca di scegliere sicuramente tra le due ipotesi accennate, si può tuttavia ritenere la seconda più verosimile della prima; poichè l'esperienza degli allevatori dei cavalli ci insegna che la mortalità durante lo sviluppo è maggiore nelle razze equine più rigorosamente selezionate che in quelle comuni, le quali più si avvicinano allo stato naturale; e differenze analoghe si riscontrano, secondo l'osservazione comune, nei cani, nei gatti, ed in altre specie domestiche.

Diviene pertanto di grande interesse studiare l'influenza, che possono esercitare sui caratteri degli individui le circostanze per le quali la procreazione e l'allevamento dei nati nelle razze umane incivilite differiscono da quelli delle specie animali superiori allo stato naturale.

Tali circostanze si riducono essenzialmente a tre:

(*a*) La specie umana si riproduce in tutti i periodi dell'anno, mentre le specie animali superiori presentano un solo periodo o pochi periodi all'anno di riproduzione;

(*b*) Le specie animali allo stato naturale si riproducono tosto che l'organismo diviene atto alla riproduzione, mentre nelle razze umane incivilite intercede di regola un periodo più o meno lungo tra il momento, in cui l'organismo diviene atto alla riproduzione, e il momento in cui comincia effettivamente a riprodursi;

(*c*) Nelle razze umane incivilite, lo sviluppo dei sentimenti altruistici difende gli esseri deboli e malati dall'opera eliminatrice della selezione naturale e spesso li mette in condizione di prendere parte alla procreazione delle generazioni future.

3. Lo studio dell'influenza di queste tre circostanze è tanto più importante in quanto pare che soprattutto al loro regolamento dovrà essere diretta la propaganda degli Eugenisti.

Si può infatti pensare a migliorare la razza umana con mezzi svariati, e principalmente:

(1) scegliendo i riproduttori;

(2) ponendo i riproduttori in condizioni di ambiente particolarmente favorevoli;

(3) regolando nel modo migliore le circostanze in cui le unioni si compiono, sia per ciò che riguarda l'età assoluta e relativa dei riproduttori, sia per ciò che riguarda la stagione delle unioni e l'intervallo tra i concepimenti successivi;

(4) ponendo i nati in condizioni di ambiente particolarmente favorevoli.

Il miglioramento dell'ambiente, in cui vivono i riproduttori e si sviluppano i nati, ha certo benefici effetti sulla razza umana; per valutarne l'importanza, basta pensare che soprattutto per la diversa bontà dell'ambiente differiscono le classi elevate dalla popolazione generale, e tener presente d'altra parte le fortissime differenze che tra quella e questa abbiamo riscontrato, per ciò che concerne la mortalità durante lo sviluppo.

Ma l'egoismo individuale e l'affetto famigliare paiono sufficienti per assicurare, nei limiti del possibile, tale miglioramento, mentre, per ciò che concerne i mezzi (1) e (3) per migliorare la razza, l'istinto sessuale, le abitudini sociali o le ambizioni individuali possono condurre a risultati in contrasto coi fini dell'Eugenica. Sui mezzi (1) e (3) deve pertanto concentrarsi l'attenzione dell'Eugenista. Ora tali mezzi consistono appunto nel regolamento delle circostanze, per cui la riproduzione e l'allevamento dei nati dell'uomo differiscono da quelli delle specie animali superiori allo stato naturale.

4. Questa memoria ha precisamente lo scopo di portare nuovi contributi allo studio di codeste circostanze in base a dati tratti in gran parte dalle statistiche ufficiali più progredite del movimento della popolazione, in parte da rilevazioni appositamente eseguite, o fatte eseguire, dall'A. negli uffici di statistica municipale di Roma e di Cagliari e nelle Cliniche Ostetriche di parecchie città italiane.

Capitolo II°.

I nati secondo il mese del loro concepimento.

5. Il fenomeno della periodicità delle nascite secondo i mesi è stato osservato da tempo su dati relativi a molti Stati di Europa. In questi Stati, il numero delle nascite offre due massimi: l'uno, più prolungato, va, nella maggior parte dei paesi, da Gennaio ad Aprile e corrisponde ai concepimenti da Aprile a Luglio; l'altro, più breve e di regola più debole, cade nel Settembre e corrisponde ai concepimenti del Dicembre. Questo si suole attribuire a cause sociali, in particolare al ritorno in patria di molti assenti in occasione delle feste del Natale e del Capodanno e al consequente riannodarsi di interrotti rapporti coniugali; quello si fa risalire, esclusivamente o prevalentemente, a cause naturali, vale a dire a una maggiore attitudine a riprodursi dell'organismo umano in primavera. La circostanza che le nascite illegittime mostrano più prolungato ed intenso il massimo dei mesi invernali e, di solito, o non presentano affatto o presentano attenuato il massimo del Settembre, è riguardata come una conferma di tale spiegazione.

Ammessa la quale, viene naturale porre in relazione la maggiore fecondità della specie umana nella primavera col periodo di calore che, nella maggior parte delle specie animali monomestruate, cade precisamente in codesta stagione: la maggior frequenza dei concepimenti in primavera rappresenterebbe appunto, secondo molti autori (Westermarck, Haycraft, Ewart), un residuo atavico di una primitiva stagione di riproduzione.

Giunti a questo punto, vien fatto di domandarci se gli individui concepiti in primavera, seguendo, per così dire, l'uso primordiale della nostra specie, non presentino per avventura caratteri particolarmente favorevoli; movendo

Tavola II.

NATI SECONDO I MESI IN EUROPA (1).

Media giornaliera dei nati nei singoli mesi fatta = 1000 la media giornaliera per tutto l'anno.

Mese della nascita	Irlanda (2) 1891-900	Inghilterra e Galles (2) 1838-903	Norvegia (2) 1896-1900	Svezia (3) 1898-902	Finlandia (3) 1878-80	Danimarca (3) 1895-900	Olanda (2) 1900-904	Germania (3) 1903	Austria occidentale (3) 1871-80	Svizzera (3) 1871-90	Belgio (2) 1841-900	Lussemburgo (3) 1901-903	Francia (3) 1872-80	Italia (3) 1907-909	Spagna (2) 1878-901	Rumania (2) 1880-94	Bulgaria (3) 1902	Serbia (3) 1901	Croazia e Slavonia (2) 1900-902	Galizia e Bucovina (3) 1871-80	Ungheria (2) 1900-902	Probabile mese del concepimento
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Gennaio			*1013*	*1026*	*1078*	977	*1030*	*1007*	*1043*	*1010*(4)	*1049*	*1011*	*1006*	*1107*(5)	*1095*	884	*1194*	*1135*	955	*1175*	992	Aprile
Febbraio	*1048*	*1034*	*1045*	*1025*	*1047*	*1044*	*1096*	*1045*	*1075*	*1030*	*1110*	*1133*	*1077*	*1225*	*1198*	*1105*	*1199*	*1305*	*1057*	*1153*	*1094*	Maggio
Marzo			*1026*	*1080*	*1063*	*1065*	*1064*	*1030*	*1051*	*1040*	*1107*	*1109*	*1080*	*1072*	*1151*	*1021*	971	*1189*	*1064*	*1065*	*1092*	Giugno
Aprile			*1025*	*1042*	*1008*	*1042*	*1026*	*1023*	*1026*	*1020*	*1055*	*1036*	*1059*	*1026*	*1049*	*1069*	933	*1035*	*1109*	*1007*	*1041*	Luglio
Maggio	*1061*	*1028*	*1020*	979	*1028*	*1011*	990	*1025*	*1005*	1000	*1002*	*1057*	*1006*	959	979	*1083*	798	*1005*	*1025*	945	980	Agosto
Giugno			*1002*	976	*1041*	992	951	968	970	1000	965	957	966	913	907	*1016*	827	977	994	913	951	Settembre
Luglio			995	959	*1049*	973	950	978	975	*1010*	935	922	963	936	881	*1076*	927	989	924	921	951	Ottobre
Agosto	970	974	987	929	947	*1011*	987	994	959	1000	945	946	969	959	910	973	*1032*	*1010*	*1048*	942	*1005*	Novembre
Settembre			*1102*	*1097*	*1023*	*1047*	*1018*	*1023*	989	*1010*	970	934	985	*1024*	974	957	*1178*	*1008*	*1114*	926	*1057*	Dicembre
Ottobre			977	969	877	974	958	950	984	970	947	946	958	994	961	*1211*	*1315*	*1046*	*1018*	987	*1007*	Gennaio
Novembre	923	965	888	941	885	939	956	976	983	970	951	*1026*	971	984	945	961	979	707	902	984	952	Febbraoi
Dicembre			926	981	956	927	980	984	945	960	969	936	965	905(5)	960	651	661	609	795	991	884	Marzo

(1) Questi dati sono il risultato di elaborazioni dell'A. tranne che per la Francia, l'Austria Occidentale, la Svizzera, la Finlandia, la Galizia e Bucovina, per cui sono tolti dal MAYR *(Statistik und Gesellschaftslehre* Freiburg i B. Mohr, 1897. II. Band. Pag. 172*)* e per il Lussemburgo e la Germania, per cui sono tolti dal *Mouvement de la population dans la Grand Duché de Luxembourg pendant l'année, 1903* (Luxembourg Worré-Martens, 1905) Pagg. 132-133, Idati originari furono ricavati dalle Statistiche Ufficiali tranne che per la Bulgaria e per la Spagna, per cui furono comunicati manoscritti all'A. dalle rispettive direzioni generali dalla Statistica.

(2) Sono esclusi dal computo i nati-morti.

(3) Sono compresi nel computo i nati-morti.

(4) L'ultima cifra è arrotondata.

(5) La media giornaliera dei nati risulta in Italia abbassata per il Dicembre e innalzata per il Gennaio per il ritardo che in molte regioni si frappone alla denunzia dei nati negli ultimi giorni dell'anno. cfr. R. BENINI. *Le denunzie ritardate di nascite in alcuni compartimenti italiani.* Rendiconti della R. Acc. dei Lincei. Vol. XIX. Fasc. 12° Roma Tip della R. Acc. dei Lincei 1911, e, anche per altri Stati, F. CORRIDORE *Denunzie ritardate di nascite in Italia e in altri Stati.* Roma. Loescher, 1911.

Tavola III.

NATI SECONDO I MESI (1).

Media giornaliera dei nati nei singoli mesi fatta = 1000 la media giornaliera per tutto l'anno.

Mese della nascita per l'emisfero boreale	America del Nord				America del Sud	Oceania			Asia				Africa	Mese della nascita per l'emisfero australe
	Groenandia occidentale (2) 1851-90	Distretto di Columbia (3) 1908-909	Città di Providence (4) 1856-904	Messico (3) 1895-901	Città di Buenos Ayres (3) 1906-907	Nuova Galles del Sud (3) 1896-905	Victoria (3) 1900-905	Australia Occidentale (3) 1898-904	Giappone (3) 1899-903	Bengala (3) 1900-905	Madras (3) 1903-905	Bombay (3) 1903-905	Isola Maurizio (3) 1903-905	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Gennaio	*1130*(5)	*1033*		942	*1075*	*1016*		*1065*	*1284*	984				Luglio
Febbraio	*1100*	*1109*	985	956	*1031*	*1046*	*1170*	*1044*	*1218*	*1027*	859	926	974	Agosto
Marzo	*1080*	*1096*		*1011*	*1016*	*1032*		*1057*	*1213*	*1036*				Settembre
Aprile	990	856		997	*1032*	*1009*		*1009*	*1034*	*1001*				Ottobre
Maggio	*1020*	878	977	980	981	986	919	998	865	942	994	858	*1086*	Novembre
Giugno	960	*1021*		*1024*	921	941		901	748	877				Dicembre
Luglio	*1010*	*1013*		*1078*	948	987		943	822	873				Gennaio
Agosto	920	*1016*	*1021*	*1010*	938	986	938	958	843	969	*1093*	*1001*	*1004*	Febbraio
Settembre ...	970	*1028*		*1005*	948	*1000*		969	975	*1065*				Marzo
Ottobre	910	963		*1089*	*1002*	978		*1016*	961	*1077*				Aprile
Novembre ...	940	989	*1018*	963	*1063*	*1003*	970	*1011*	*1033*	*1081*	*1055*	*1215*	935	Maggio
Dicembre ...	970	999		943	*1040*	*1004*		*1026*	*1018*	*1073*				Giugno

(1) Idati sono il risultato di elaborazioni dell'A., tranne che per la Groenlandia, per cui sono tolti dal *Sammendrag of statistiske Oplysninger om Groënland*, Kiobenhavn, Bianco Lunos, 1912. Idati originari sono ricavati dalle statistiche ufficiali, tranne che per il Bengala, per cui furono comunicati mano scritti all'A. dal Director General of Commercial Intelligence (31 Maggio, 1906). (2) Popolazione Indigena. (3) Esclusi i nati-morti. (4) Compresi i nati-morti fino al 1896, esclusi negli anni seguenti. (5) L'ultima cifra è arrotondata.

da questa idea, l'Ewart avrebbe accertato che i nati nei mesi di Gennaio-Marzo, e, dopo di essi, quelli di Aprile-Giugno, si presentano, a 11 anni, in condizioni di peso e di statura particolarmente vantaggiosi e che, al 7.o e al 12.o anno, la sopravvivenza dei nati nel primo semestre (Gennaio-Giugno) è nettamente superiore a quella dei nati nel secondo semestre (Luglio-Dicembre) (7).

6. Una raccolta di materiali più estesi sulle nascite secondo i mesi (Tavole II. e III.) viene però a infirmare lo stesso punto di partenza di tutto questo corso di idee.

Non mancano, nella stessa Europa (cfr. Tav. II.), paesi (Danimarca, Rumania, Croazia e Slavonia, Ungheria), in cui le nascite del Gennaio, corrispondenti ai concepimenti del cuore della primavera, rimangono al disotto della media; in altri, i concepimenti della primavera (nascite di Gennaio-Marzo) vengono uguagliati quasi (Inghilterra e Galles, Norvegia) o superati (Irlanda) da quelli dell'estate (nascite di Aprile-Giugno).

Ma i dubbi maggiori sorgono dall'esame del fenomeno nei paesi fuori di Europa. I dati della Tav. III., i primi, credo, del genere che vengono pubblicati, se non sono così numerosi da poter stabilire per le altre parti del mondo regolarità del tipo di quella riscontrata in Europa, sono però più che sufficienti per mostrare come la regolarità riscontrata in Europa non valga per gli altri paesi. Nell'America del Nord, si nota spesso (Distretto di Columbia, Città di Providence, Messico) uno spiccato massimo di nascite nell'estate e anche nell'autunno (corrispondenti a concepimenti autunnali o invernali), mentre il massimo dei concepimenti primaverili talora non si riscontra (Providence), talora si avverte appena (Messico). In Groenlandia, oltre al massimo, molto pronunciato, delle nascite in Gennaio-Marzo, se ne osservano altri in Maggio e Luglio. Nell'America del Sud, come nell'Australia, nel Giappone, nel Bengala, esiste un massimo di nascite nell'inverno, ma esso (tranne nella Victoria) comincia già a pronunciarsi in Settembre, Ottobre e Novembre, e, nel Bengala, anzi, è, in questi mesi, più alto che nei mesi invernali. A Madras, a Bombay, nell'isola Maurizio, poi, i dati trimestrali non conservano affatto traccia di un massimo di concepimenti primaverili, mentre le nascite salgono sopra la media in corrispondenza dei concepimenti dell'autunno e dell'inverno (Bombay, Madras) o dell'estate e dell'autunno (Maurizio).

Questi risultati per varii paesi non europei, mentre differiscono notevolmente tra di loro, si accordano nel mostrare, per le nascite secondo i mesi, un andamento più o meno diverso da quello da tempo osservato in Europa. Possiamo dunque dire che l'idea di un massimo naturale di concepimenti in primavera, in contrapposto ad una depressione naturale nelle altre stagioni, non pare sostenibile di fronte ai materiali più estesi che oggi può fornire la rilevazione statistica. La stessa variabilità dei risultati suggerisce di cercare la spiegazione della periodicita, mensile delle nascite in circostanze variabili da paese a paese.

Tavola IV.—NASCITE SECONDO I MESI.*

Mese della nascita per l'emisfero boreale	Media giornaliera dei nati nei vari mesi fatta = 1000 la media giornaliera per tutto l'anno						Mese della nascita per l'emisfero australe
	Distretto di Columbia 1908-909		Isola Maurizio 1903-905		Giappone 1899-903		
	Popolaz. bianca	Popolaz. di colore	Popolaz. Europea	Popolaz. Indiana	Tutto lo Stato	Isola di Yeso	
1	2	3	4	5	6	7	8
Gennaio ...	*1034*	*1029*			*1284*	*1179*	Luglio
Febbraio...	*1046*	*1260*	997	965	*1218*	*1141*	Agosto
Marzo ...	*1110*	*1066*			*1213*	*1171*	Settembre
Aprile ...	884	794			*1034*	*1091*	Ottobre
Maggio ...	900	831	*1049*	*1100*	865	959	Novembre
Giugno ...	*1016*	*1029*			748	911	Dicembre
Luglio ..	*1001*	*1039*			822	845	Gennaio
Agosto ...	*1012*	*1023*	975	*1015*	843	856	Febbraio
Settembre	*1023*	1037			975	987	Marzo
Ottobre ...	990	903			961	951	Aprile
Novembre	983	*1002*	977	919	*1033*	*1010*	Maggio
Dicembre	996	*1005*			*1018*	912	Giugno

* Dati elaborati dall'A. in base ai dati originari delle statistiche ufficiali.

7. Che la razza eserciti un'influenza decisiva, per alcuni paesi almeno, può escludersi: i bianchi e i negri del distretto di Columbia; i discendenti dei Francesi e gli immigrati Indiani dell'isola Maurizio; il complesso della popolazione giapponese e gli abitanti di Yeso, in parte discendenti più o meno puri dei primitivi Aïnos, non mostrano differenze essenziali nella periodicità mensile delle nascite (Cfr. Tav. IV.). Gli Indiani di Maurizio in particolare, per quanto si può giudicare da dati trimestrali, rassomigliano, per questo carattere, assai più ai discendenti europei della stessa isola che alle popolazioni della madre patria (Cfr. nella Tav. III. i dati per Madras, Bombay e il Bengala).

Che il clima possa esercitare una certa influenza, pare invece probabile. In realtà, nei paesi più settentrionali di Europa, il massimo delle nascite, invece che fermarsi all'Aprile od al Maggio, spesso (Irlanda, Inghilterra e Galles, Norvegia, Finlandia) si prolunga fino al Giugno od al Luglio; e un fenomeno simile si avvera nella montagnosa Svizzera (Cfr. Tav. II.). Nei paesi più caldi, a Madras, a Bombay, nel Bengala, nel Messico, il massimo dei concepimenti coincide in sostanza con la stagione più fredda. Se, nei paesi freddi, noi consideriamo le parti più settentrionali, troviamo talvolta (per es. nei distretti di Tromsoe e Finmarken in confronto a tutta la Norvegia, Cfr. Tav. V. Col. 4-7) che i massimi dei concepimenti si spostano verso i mesi più caldi; e se, nei paesi caldi, noi consideriamo le parti più meridionali (per es. gli Stati di Yucatan, Campeche, Chiapas e Tobasco nel Messico, Cfr. Tav. V. Col. 10-11) troviamo che i massimi si spostano invece verso i mesi più freddi. Altri confronti danno però esito negativo. In Isvezia, per esempio, il massimo dei concepimenti primaverili

non si prolunga nell'estate, né in estate si avvera un massimo continuato nella freddissima Groenlandia (8) (Cfr. Tav. II.). La Groenlandia del Nord, in confronto alla Groenlandia del Sud, la parte settentrionale della Svezia, in confronto a tutto lo Stato, e isole Faer-Oer, in confronto a tutta la Danimarca propriamente detta, mostrano si, nella periodicità mensile delle nascite, differenze notevoli, ma queste non sembrano potersi ricondurre all'influenza diretta del clima (Cfr. Tav. V.).

Tavola V.—NASCITE SECONDO I MESI (1).

Media giornaliera di nati nei vari mesi, fatta = 1000 la media giornaliera per tutto l'anno.

Mese della nascita	Groenlandia dell'Ovest 1851-900		Norvegia nati legittimi 1896-900		Norvegia nati illegittimi 1896-900		Svezia		Messico		Danimarca		Probabile mese del concepimento
	Groenlandia del Nord	Groenlandia del Sud	Tromsöe e Finmarken	Tutto lo Stato	Tromsöe e Finmarken	Tutto lo Stato	Noorbotten 1901-905	Tutto lo Stato 1893-902	Yucatan, Campeche, Chiapas e Tobasco 1895-1900	Tutta la Confederazione 1895-901	Isole Faer Oer 1896-900	Tutta la Danimarca p.d. 1895-900	
1	2	3	4	5	6	7	8	9	10	11	12	13	14
Gennaio ...	*1190*(2)	*1100*(2)	824	*1013*	855	*1007*	*1076*	*1026*	926	942			Aprile
Febbraio ...	*1200*	*1070*	861	*1044*	777	966	*1029*	*1025*	908	956	836	*1029*	Maggio
Marzo ...	*1140*	*1040*	*1027*	*1026*	*1011*	966	964	*1080*	899	*1011*			Giugno
Aprile ...	880	*1030*	*1181*	*1025*	*1101*	*1003*	974	*1042*	943	997			Luglio
Maggio ...	830	*1100*	*1318*	*1020*	*1360*	*1095*	983	979	909	980	864	*1015*	Agosto
Giugno ...	*1000*	960	*1231*	*1002*	*1420*	*1103*	964	976	*1015*	*1024*			Settembre
Luglio ...	*1030*	*1000*	*1147*	995	*1026*	980	*1004*	959	*1176*	*1078*			Ottobre
Agosto ...	930	900	*1186*	987	*1086*	935	*1028*	929	*1021*	*1010*	*1268*	*1011*	Novembre
Settembre ...	950	990	*1122*	*1102*	*1086*	*1118*	*1112*	*1097*	*1035*	*1005*			Dicembre
Ottobre ...	960	890	866	977	937	943	913	969	*1115*	1089			Gennaio
Novembre ...	900	950	654	888	647	894	907	941	*1051*	963	*1026*	947	Febbraio
Dicembre ...	990	970	579	926	684	993	1049	981	993	943			Marzo

(1) Dati elaborati dell'A. in base ai dati originari delle statistiche ufficiali, tranne che per la Groenlandia, per la quale i dati sono tolti dal *Sammendrag af statistiske oplysninger om Groenland.* Op. cit. Pag. 12. (2) L'ultima cifra é arrotondata.

Dato che un'influenza del clima esista, si potrebbe pensare che in questi paesi essa fosse controbilanciata o superata da quella di altre circostanzè : è probabile che, in paesi che vivono di pesca, come le Faer-Oer e la Groenlandia, abbia decisiva influenza il lavoro fisico o l'allontanamento più o meno lungo dei maschi dalla famiglia durante certe stagioni dell'anno. In generale, pare plausibile ammettere che la diversità delle occupazioni, i viaggi, le feste, i periodi di digiuno o di lutto ed altre costumanze civili o religiose possano esercitare una notevole influenza sulla maggiore o minore frequenza dei concepimenti nelle varie parti dell'anno. L'influenza dei costumi religiosi appare chiara se si confrontano le nascite dei circondari protestanti della Germania con quelli dei circondari cattolici o dei misti (Cfr. Tav. VI.). All'influenza delle diverse occupazioni professionali possono forse farsi risalire differenze tra la città e la campagna, che in Rumenia, per esempio, si avverano con notevole intensità (Cfr. Tav. VI.). E'probabile

Tavola VI.—NASCITE SECONDO I MESI (1).

Mese della nascita	Media giornaliera dei nati nei vari mesi, fatta = 1000 la media giornaliera per tutto l'anno								Probabile mese del concepimento
	Rumania 1880-94		Germania, 1872-80 Nascite legittime			Germania, 1872-80 Nascite illegittime			
	Nati in Città	Nati nei comuni rurali	Circondari protestanti	Circondari cattolici	Circondari misti	Circondari protestanti	Circondari cattolici	Circondari misti	
1	2	3	4	5	6	7	8	9	10
Gennaio	*1074*	847	*1017*	*1004*	*1025*	*1091*	*1077*	*1097*	Aprile
Febbraio	*1193*	*1092*	*1036*	*1043*	*1057*	*1136*	*1178*	*1158*	Maggio
Marzo	*1073*	*1012*	*1016*	*1043*	*1046*	*1077*	*1126*	*1115*	Giugno
Aprile	990	*1083*	982	*1024*	*1002*	*1025*	*1052*	*1064*	Luglio
Maggio	929	*1112*	958	996	970	988	*1019*	*1020*	Agosto
Giugno	932	*1032*	947	978	937	950	975	963	Settembre
Luglio	960	*1098*	965	982	951	903	942	927	Ottobre
Agosto	968	974	*1003*	980	988	878	860	870	Novembre
Settembre ...	938	961	*1077*	*1017*	*1048*	*1018*	953	963	Dicembre
Ottobre	*1058*	*1240*	*1012*	993	*1001*	918	946	887	Gennaio
Novembre ...	*1006*	955	998	988	997	965	928	937	Febbraio
Dicembre ...	893	605	993	955	983	*1061*	958	*1010*	Marzo

(1) I dati per la Rumania furono elaborati dall'A. in base ai dati originari delle statistiche ufficiali; quelli per la Germania sono tolti dal MAYR. *Statistik und Gesellschaftslehre.* Op. cit. Pag. 172.

Tavola VII.—MATRIMONI E NASCITE SECONDO I MESI NEL LUSSEMBURGO (1901-903).*

Mese della nascita	Media giornaliera dei vari mesi, fatto = 1000 la media giornaliera per tutto l'anno					Mese del matrimonio
	Matrimoni	Nascite legittime		Nascite illegittime	Nascite illegittime e legittime escluse le prime nascite legittime	
		Prime nascite	Nascite seguenti			
1	2	3	4	5	6	7
Gennaio	*1314*	*1024*	998	*1059*	*1000*	Aprile
Febbraio	*1202*	*1197*	*1108*	*1290*	*1117*	Maggio
Marzo	820	*1173*	*1091*	*1245*	*1099*	Giugno
Aprile	699	909	*1068*	*1191*	*1073*	Luglio
Maggio	716	985	*1075*	*1232*	*1083*	Agosto
Giugno	935	893	974	903	971	Settembre
Luglio	870	864	943	781	935	Ottobre
Agosto	*1258*	996	934	781	927	Novembre
Settembre	772	915	936	931	936	Dicembre
Ottobre	*1412*	895	967	768	958	Gennaio
Novembre	*1715*	*1210*	983	903	979	Febbraio
Dicembre	367	955	932	940	932	Marzo

* Dati ricavati dal *Mouvement de la population dans les Grand Duché pendant l'année, 1903.* Op. cit. Pagg. 123, 124, 125, 132.

però che qui, come certo in altri casi, entri in giuoco l'influenza della diversa frequenza dei matrimoni nei vari mesi.

Non so su quali dati di fatto sia fondata l'affermazione, divenuta ormai un luogo comune tra gli statistici, che le oscillazioni mensili nella frequenza dei matrimoni non esercitino un'influenza sensibile sulle oscillazioni mensili nella frequenza delle nascite. Il fatto dovrebbe trovare la sua spiegazione nella variabilità dell'intervallo tra il matrimonio e la prima nascita. Se non che è chiaro che tale variabilità può presentare differenze essenziali da paese a paese, secondo la maggiore o minore diffusione delle pratiche neo-malthusiane, la composizione per età degli sposi, e, soprattutto, la maggiore o minore frequenza delle concezioni antenuziali; per modo che è ben possibile che codesta affermazione risulti più o meno esatta per uno Stato e invece più o meno infondata per un altro. La prova decisiva della sua verità o falsità, per un dato paese, si può trarre dal confronto della frequenza dei matrimoni nei vari mesi colla frequenza dei concepimenti separatamente dei primogeniti legittimi e degli altri nati. Tale confronto si può eseguire per il Lussemburgo (Cfr. Tav. VII.). La frequenza mensile dei primogeniti (Col. 3) differisce notevolmente da quella delle altre nascite legittime (Col. 4) e di tutte le altre nascite (Col. 6): ora tali differenze sembrano, potersi ricondurre all'influenza dei matrimoni di 9 o 10 mesi prima. Infatti, quando i matrimoni di 9 o 10 mesi prima mostrano una frequenza superiore alla media annuale, la frequenza dei primogeniti è relativamente più alta di quella delle altre nascite; il contrario si avvera nel caso opposto. Tra la frequenza dei primogeniti in un dato mese e la frequenza dei matrimoni di 9 o 10 mesi prima, si avvera un innegabile parallellismo, che probabilmente risulterebbe anche più saliente se si potessero considerare periodi quindicinali invece che mensili.

Indizi di un'influenza delle variazioni mensili del numero dei matrimoni sulle variazioni mensili del numero delle nascite si possono trarre anche per altra via. Se il massimo delle nascite, che si verifica in autunno, dipendesse veramente solo dal riannodarsi dei contatti, che ha luogo in occasione delle feste Natalizie e di Capodanno, esso dovrebbe avverarsi solo nel Settembre o, al più, anche nei primi giorni dell'Ottobre: nelle nascite illegittime, per vero, là dove si riscontra il massimo autunnale (Norvegia, Svezia, Danimarca, Germania, Bologna, Ungheria, Cfr. Tav. VIII.), esso cade appunto in codesti due mesi; nelle nascite legittime, invece, (Cfr. Tav. VIII.) o nelle nascite complessive (Cfr. Tav. II.), esso si verifica non di rado, e talvolta con notevole intensità, anche in Agosto (Danimarca, Germania, Svizzera, Bologna, Ungheria, Bulgaria, Serbia, Croziae Slavonia). Non si può certo supporre che il numero delle gravidanze di otto mesi sia così grande che i concepiti alla fine del Dicembre aumentino sensibilmente il numero dei nati in Agosto; vien fatto invece di pensare ad un'influenza dei matrimoni che nel Novembre si contraggono in gran copia.

Tavola VIII. NASCITE LEGITTIME ED ILLEGITTIME SECONDO I MESI (1).

Media giornaliera dei nati nei singoli mesi fatta = 1000 la media giornaliera per tutto l'anno.

Mese della nascita	Norvegia (2) 1896-900		Svezia (2) 1898-902		Danimarca (3) 1895-900		Germania (3) 1903		Svizzera 1876-90		Lussemburgo (3) 1901-903		Bologna (2) 1877-900		Regno di Ungheria (2) 1900-902		Messico (3) 1895-901		Probabile mese del concepimento
	legitt.	illegitt.	legitt.	illegitt.	legitt.	illegitt.	legitt.	illegitt.	legitt.	illegitt.	legitt.	illegitt.	legitt.	illegitt.	legitt.	illegitt.	legitt.	illegitt.	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Gennaio ...	*1013*	*1007*	*1022*	*1038*	974	*1002*	*1006*	*1022*	*1010*(4)	*1100*(4)	*1009*	*1059*	*1041*	986	979	*1062*	964	924	Aprile
Febbraio ...	*1044*	966	*1025*	*1014*	*1043*	*1056*	*1037*	*1135*	*1020*	*1130*	*1126*	*1290*	*1081*	*1044*	*1084*	*1139*	981	929	Maggio
Marzo	*1026*	966	*1075*	*1110*	*1066*	*1058*	*1025*	*1082*	*1030*	*1080*	*1103*	*1245*	*1032*	*1090*	*1087*	*1106*	*1004*	996	Gingno
Aprile	*1025*	*1003*	*1038*	*1068*	*1040*	*1066*	*1017*	*1080*	*1020*	*1060*	*1030*	*1191*	998	*1029*	*1050*	*1049*	*1013*	962	Luglio
Maggio ...	*1020*	*1095*	971	*1055*	*1008*	*1037*	*1020*	*1076*	1000	*1050*	*1050*	*1232*	950	946	986	988	995	950	Agosto
Giugno ...	*1002*	*1103*	965	*1082*	991	*1007*	967	982	1000	970	959	903	922	949	957	947	*1046*	*1017*	Septembre
Luglio ...	995	980	960	963	978	926	983	923	*1010*	920	927	781	974	941	953	892	*1082*	*1074*	Octobre
Agosto ...	987	935	943	814	*1023*	906	*1006*	860	*1010*	880	952	781	*1005*	980	*1016*	957	*1005*	*1022*	Novembre
Settembre ...	*1102*	*1118*	*1103*	*1072*	*1052*	*1002*	*1026*	*1001*	*1010*	950	934	931	*1064*	*1030*	*1068*	*1034*	983	*1005*	Dicembre
Ottobre ...	977	943	975	923	976	951	957	878	970	890	953	768	*1008*	*1032*	*1012*	970	*1011*	*1145*	Gennaio
Novembre ...	888	894	946	884	934	985	978	960	960	980	*1031*	903	966	978	947	930	944	979	Febbraio
Dicembre ...	926	993	981	984	919	*1003*	982	*1016*	960	990	936	940	971	*1005*	866	932	928	976	Marzo

(1) Dati elaborati dall'A. in base ai dati originari ricavati dalle statistiche ufficiali, tranne che per la Germania ei il Lussemburgo per cui i dati sono tolti direttamente dal *Mouvement de la population dans le Grand Duche du Luxembourg*. Op. cit. Pag. 132 e 133 e per la Svizzera, per la quale i dati sono tolti dal PRINZING, *Handbuch der medizinischen Statistik*, Jena, Fischer, 1906, Pag. 63.

(2) Esclusi i nati-morti. (3) Compresi i nati-morti. (4) L'ultima cifra è arrotondata.

Possiamo dunque dire, concludendo, che le variazioni, che, coi mesi, presentano il clima, le occupazioni professionali, le costumanze civili e religiose delle popolazioni, le migrazioni, il numero dei matrimoni, esercitano certamente, sulle variazioni mensili delle nascite, una influenza notevole e tale che non è possibile decidere se, indipendentemente da codeste circostanze, si avvererebbe un massimo naturale di concepimenti in una piuttosto

Tavola IX.—FREQUENZA DEI PARTI PLURIMI SECONDO LE STAGIONI.*

Mesi della nascita.	Nati da parti plurimi per cento nati.				Parti plurimi per 100 nati.	Parti plurimi per 100 parti.	Parti doppi per 100 nati.
	Amsterdam 1850-904	Bologna 1877-900	Firenze 1906-909	Serbia 1901	Lussemburgo 1901-903	Spagna 1901	Berlino 1899-904
1	2	3	4	5	6	7	8
Dicembre-Febbraio ...	2·28	2·24	2·37	*3·33*	*1·58*	0·88	1·090
Marzo-Maggio ...	2·28	2·53	2·28	2·97	1·27	0·86	*1·091*
Giugno-Agosto ...	2·20	*2·72*	*2·77*	2·58	1·18	*0·97*	1·005
Settembre-Novembre	*2·43*	2·35	2·23	1·71	1·16	0·79	1·080

*Dati elaborati dall'A. in base ai dati originari delle statistiche ufficiali.

che in altra stagione dell'anno, per effetto di una maggior attitudine dell'organismo umano a riprodursi.

8. D'altra parte, l'esame della frequenza dei parti plurimi e della vitalità dei nati secondo la stagione del concepimento non suffraga in nessun modo l'idea che esista, nella specie umana, un residuo atavico di una primitiva stagione di riproduzione.

Anche nei parti plurimi (almeno nei parti plurimi pluriovuli) si vuol vedere da molti un residuo atavico; sarebbe pertanto da attendersi, in base a tale idea, che la loro frequenza risultasse maggiore nei concepimenti di quel periodo dell'anno che avrebbe segnato la stagione primitiva di riproduzione della specie, vale a dire nei concepimenti della primavera, e quindi nelle nascite dell'inverno. I dati, che ho potuto elaborare (Cfr. Tav. IX.), sulla frequenza dei parti plurimi secondo le stagioni, non mostrano invece in proposito alcuna regolarità: in due paesi (Serbia, Lussemburgo), la frequenza massima si riscontra fra i nati di Dicembre-Febbraio; in tre (Bologna, Firenze, Spagna), tra quelli di Giugno-Agosto; in uno (Berlino), tra quelli di Marzo-Maggio; in uno infine (Amsterdam) tra quelli di Settembre-Novembre.

9. Nè la stagione del concepimento sembra esercitare alcuna influenza sulla vitalità dei prodotti. Per alcuni paesi, la vitalità dei prodotti si può seguire fin dai primi tempi del loro sviluppo. Gli annuari di Vienna e di

Tavola X.—ABORTI E NATI-MORTI SECONDO LA PROBABILE STAGIONE DEL CONCEPIMENTO.*

BUDAPEST, 1903-905.

Vitalità dei nati	Stagione probabile del concepimento.				Complessivamente
	Primavera	Estate	Autunno	Inverno	
1	2	3	4	5	6
Figli legittimi.					
Aborti	1411	1418	1480	1418	5727
Nati-morti	348	377	322	304	1351
Nati-vivi	11703	12713	11708	11481	47605
Aborti % nati-vivi	*12·1*	*11·2*	*12·6*	*12·4*	*12·0*
Nati-morti % nati-vivi	*3·0*	*3·0*	*2·7*	*2·6*	*2·8*
Aborti e nati-morti % nati-vivi ...	*15·1*	*14·2*	*15·3*	*15·0*	*14·8*
Figli illegittimi.					
Aborti	477	544	448	506	1975
Nati-morti	201	190	155	178	724
Nati-vivi	4636	4569	4138	4358	17701
Aborti % nati-vivi	*10·3*	*11·9*	*10·8*	*11·6*	*11·2*
Nati-morti % nati-vivi	*4·3*	*4·2*	*3·7*	*4·1*	*4·1*
Aborti e nati-morti % nati-vivi ...	*14·6*	*16·1*	*14·5*	*15·7*	*15·3*
Figli legittimi ed illegittimi.					
Aborti	1888	1962	1928	1924	7702
Nati-morti	549	567	477	482	2075
Nati-vivi	16339	17282	15846	15839	65306
Aborti % nati-vivi	*11·56*	*11·35*	*12·17*	*12·15*	*11·79*
Nati-morti % nati-vivi	*3·36*	*3·28*	*3·01*	*3·04*	*3·18*
Aborti e nati-morti % nati-vivi ...	*14·92*	*14·63*	*15·18*	*15·19*	*14·97*

*Dati elaborati dall'A. in base ai dati originari delle statistiche ufficiali.

Tavola XI.—ABORTI E NATI-MORTI SECONDO LA PROBABILE STAGIONE DEL CONCEPIMENTO, VIENNA, 1902-903.*

Vitalità dei nati	Stagione probabile del concepimento				Complessivamente
	Primavera	Estate	Autunno	Inverno	
1	2	3	4	5	6
Aborti	1187	1312	1259	1272	5030
Nati-morti (†)	441	504	480	412	1837
Nati-vivi	25·363	27·257	25·653	25·162	103·435
Aborti % nati-vivi	*4·68*	*4·81*	*4·91*	*5·06*	*4·86*
Nati-morti % nati-vivi	*1·74*	*1·85*	*1·87*	*1·64*	*1·78*
Aborti e nati-morti % nati-vivi ...	*6·42*	*6·66*	*6·78*	*6·70*	*6·64*

*Dati elaborti dall'A. in base ai dati originari delle statistiche ufficiali

†Embrioni la cui gestazione dura da 8 mesi e più.

Tavola XII.

NATI-MORTI PER CENTO NASCITE SECONDO LE STAGIONI (1).

Mese della nascita per i paesi dell'emisfero boreale	Norvegia				Svezia			Danimarca (2) 1896-900		Amsterdan (1) 1850-904	Prussia (2) 1872-81		Sassonia (2) 1891-900	Austria (2) 1898-900	Regno d'Ungheria (3) 1900-902		Budapest (2) 1882-90	Lussemburgo (2) 1901-903	Italia (3)			Spagna (3) 1878-901	Messico (4)		Bengala 1900-905 (3)	Isola Maurizio (3) 1903-905		Mese della nascita per i paesi dell' emisfero australe
	Regno (2) 1866-85		Tromsoe e Finmarken (3) 1896-900		Regno (3) 1898-902		Noorbotten (2) 1901-905	Danimarca pr. detta	Isole Faer Oer		Nati legittimi	Nati illegittimi			Nati legittimi	Nati illegittimi			Regno 1907-909	Piemonte 1900-909	Sicilia 1900-909		Tutta la confederazione 1895-901 (3)	Stati di Yucatan, Campeche, Chiapas e Tabasco 1895-900 (3)		Popolazione bianca	Popolazione indiana	
	Nati legittimi	Nati illegittimi	Nati legittimi	Nati illegittimi	Nati legittimi	Nati illegittimi																					
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
Dicembre-Febbraio	3·41	5·50	3·27	5·63	2·58	3·64	2·67	2·69	3·46	5·42	4·2	5·7	3·7	2·9	2·24	3·12	5·5	3·05	4·97	4·67	4·39	1·78	2·00	2·10	2·56	7·58	11·22	Luglio-Settembre
Marzo-Maggio	3·40	5·43	2·32	4·76	2·54	3·52	2·66	2·55	2·13	5·33	4·0	5·5	3·6	2·8	2·03	3·03	4·9	3·29	4·49	4·25	4·38	1·69	1·97	2·09	2·21	5·86	7·50	Ottobre-Dicembre
Giugno-Agosto	3·19	4·75	2·57	4·26	2·35	3·40	2·26	2·44	3·12	5·26	3·8	5·2	3·3	2·7	1·94	2·78	4·7	2·68	4·28	3·91	4·66	1·76	1·99	2·10	2·53	6·52	7·44	Gennaio-Marzo
Settembre-Novembre	3·10	4·87	3·22	4·56	2·38	3·64	2·59	2·29	3·96	5·45	3·8	5·3	3·2	2·8	1·90	2·77	4·9	3·08	4·30	3·96	4·68	1·75	1·96	2·11	2·82	7·51	9·90	Aprile-Giugno

(1) Dati elaborati dall' A. tranne che per il Regno di Norvegia, per il quale i dati sono tolti dal *Folkemaengdens Bevaegelse 1866-1885*, Kristiania. Aschehoug e Co. 1890 Pag. 184. Le percentuali delle quattro stagioni date per la Prussia, la Sassonia, l'Austria, Budapest, sono le medie delle rispettive percentuali mensili date dal PRINZING *Handbuch der medizinischen Statistik*. Op. cit. Pag. 57 e riportate nella Tavola XIII. Per le altre percentuali i dati assoluti furono ricavati dall'A. dalle Statistiche ufficiali, salvo quelli dei nati morti per mesi in Amsterdan, comunicati manoscritti all'A. da codesto Ufficio di Statistica.

(2) Nati-morti % nati vivi e morti.

(3) Nati-morti % nati vivi.

(4) Nati-morti a termine.

Tavola XIII. NATI-MORTI PER CENTO NASCITE SECONDO I MESI (1).

Mese della nascita	Norvegia (2) 1866-85		Svezia (3) 1898-902		Danimarca (3) 1896-900	Amsterdam (2) 1850-904	Prussia (2) 1872-81		Sassonia (2) 1891-900	Austria (2) 1898-900	Regno di Ungheria (3) 1900-902		Budapest (2) 1882-90	Italia (3)			Spagna (3) 1878-901	Messico (4)		Bengala (3) 1900-905	
	Nascite legittime	Nascite illegittime	Nascite legittime	Nascite illegittime			Nascite legittime	Nascite illegittime			Nascite legittime	Nascite illegittime		Regno 1907-909	Piemonte 1900-909	Sicilia 1900-909		Tutta la Confederazione (3) 1895-901	Stati di Yucatan, Campeche, Chiapas Tobasco (3) 1895-900		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	
Gennaio	3·46	5·74	2·73	3·71	2·90	5·55	4·3	5·8	3·7	2·9	2·26	3·14	5·4	4·82(5)	4·69	3·90(5)	1·77	1·89	1·90	2·47	
Febbraio	3·47	5·68	2·51	3·93	2·54	5·28	4·2	5·5	3·7	2·8	2·18	3·08	5·2	4·84	4·68	4·07	1·65	2·03	2·11	2·30	
Marzo	3·47	5·71	2·61	3·43	2·63	5·30	4·2	5·6	3·8	2·9	2·08	2·97	4·9	4·66	4·54	4·23	1·67	1·93	2·13	2·19	
Aprile	3·40	5·55	2·58	3·57	2·45	5·32	4·0	5·5	3·6	2·8	2·00	3·20	4·7	4·43	4·16	4·30	1·70	2·02	2·08	2·22	
Maggio	3·34	5·07	2·41	3·58	2·57	5·37	3·9	5·4	3·4	2·8	2·01	2·92	5·2	4·36	4·04	4·64	1·68	1·97	2·06	2·24	
Giugno	3·24	4·36	2·47	3·22	2·42	5·39	3·9	5·2	3·4	2·8	1·95	2·79	5·2	4·42	4·19	4·61	1·73	1·95	2·20	2·37	
Luglio	3·13	4·95	2·32	3·40	2·51	5·17	3·7	5·3	3·2	2·6	2·01	2·81	4·5	4·28	3·81	4·66	1·71	2·00	1·97	2·52	
Agosto	3·20	5·01	2·26	3·62	2·38	5·23	3·7	5·2	3·2	2·7	1·87	2·76	4·4	4·14	3·76	4·72	1·75	2·03	2·14	2·67	
Settembre	2·94	4·28	2·21	3·53	2·23	5·17	3·5	4·9	3·0	2·7	1·83	2·53	4·8	3·96	3·67	4·63	1·68	1·99	2·06	2·65	
Ottobre	3·16	4·90	2·40	3·35	2·21	5·53	3·8	5·6	3·3	2·8	1·84	2·79	5·1	4·30	4·00	4·75	1·71	1·85	2·08	2·81	
Novembre	3·25	5·55	2·55	4·10	2·43	5·66	4·0	5·5	3·4	2·9	2·03	3·03	4·9	4·63	4·23	4·65	1·85	2·05	2·17	2·99	
Dicembre	3·30	5·10	2·50	3·33	2·61	5·41	4·2	5·7	3·6	3·0	2·29	3·15	5·8	5·31(5)	4·63	5·52(5)	1·95	2·08	2·29	2·85	

(1) Dati elaborati dall'A. tranne che per il regno di Norvegia, per il quale i dati sono tolti dal *Folkemaegdens Bevaegelse 1866-1885*. Kristiania. Aschehoug e Co. 1890. Pag. 184, e per la Prussia la Sassonia, l'Austria, Budapest per cui i dati sono tolti dal PRINZING. *Handbuch der medizinischen Statistik*. Op. cit. Pag. 57. I dati originari vennero ricavati dall'A. dalle statistiche ufficiali, salvo quelli sui nati-morti per mesi in Amsterdam che furono comunicati all'A. manoscritti dalla Direzione di codesto ufficio municipale di Statistica. (2) Nati-morti °/₀ nati-vivi o morti. (3) Nati-morti °/₀ nati vivi. (4) Nati-morti a termine. (5) Il ritardo nelle denuncie dei nati negli ultimi giorni dell'anno, avverandosi esclusivamente per i nati vivi, ha un'influenza non trascurabile sulla percentuale di nati morti in Dicembre, abbassando la percentuale del Gennaio e innalzando quella del Dicembre.

Budapest indicano infatti, per gli aborti, il mese dell'espulsione e la durata, in mesi, della gestazione, per modo che è possibile risalire, con grossolana approssimazione, al mese del concepimento. Dico con grossolana approssimazione, perché, da una parte, la determinazione della durata di gestazione degli aborti non può farsi senza incertezze e, dall'altra, conosciuto il mese dell'espulsione e il numero dei mesi della gestazione, non si può risalire con precisione al mese del concepimento (9). Perchè il calcolo non riesca troppo incerto, conviene raggruppare i dati per stagioni. Le tavole X. e XI. espongono i risultati ottenuti. Questi non mostrano per vero alcuna spiccata regolarità. Nei nati legittimi di Budapest, la frequenza minima degli aborti si riscontra tra i concepiti in Estate; negli illegittimi di Budapest e nei nati di Vienna, fra i concepiti in Primavera; la frequenza massima, in Vienna, si riscontra nell'Inverno; in Budapest, tra i legittimi, nell'Autunno, tra gli illegittimi, nell'Estate.

Le tavole X. e XI. contengono anche i dati sulla frequenza dei nati morti secondo le stagioni; dati simili contiene, per un numero molto maggiore di paesi, la tavola XII. e dati più particolareggiati, per singoli mesi, la tavola XIII. Generalmente si osserva un forte massimo di nati-mortalità fra le nascite dei mesi invernali, equiparato talvolta nel periodo autunnale,

Tavola XIV.—MORTALITÀ NEL PRIMO MESE DI VITA SECONDO IL MESE DI NASCITA.(1)

SU 100 NATI VIVI MUOIONO NEL PRIMO MESE.

Mese.	Alta Italia 1872-80	Italia centrale 1872-80	Bassa Italia 1872-80	Italia 1872-80	Trieste 1909-911	Roma 1887-911	Firenze 1904-905 e 1907-909	Cagliari 1905-911	Sassonia 1880-84	Budapest 1896-900
1	2	3	4	5	6	7	8	9	10	11
Gennaio	17·4	15·9	9·3	13·2	8·7	6·6	11·4	7·5	5·7	5·0
Febbraio	16·3	14·2	8·3	12·1	8·6	6·9	11·2	9·4	5·3	4·3
Marzo	15·7	13·8	8·4	12·0	8·4	5·4	8·9	6·2	6·0	5·6
Aprile	10·4	9·2	6·5	8·5	7·7	4·7	6·6	6·0	6·3	4·6
Maggio	9·0	7·5	5·7	7·4	5·3	4·1	7·3	3·8	7·2	4·9
Giugno	7·6	5·8	5·3	6·5	6·1	4·7	6·9	4·3	7·3	4·3
Luglio	8·1	6·8	6·5	7·2	4·6	4·9	9·0	6·1(2)	9·6	5·6
Agosto	7·5	6·1	6·4	6·8	6·0	4·6	9·4	5·0(2)	9·2	6·4
Settembre	6·9	6·0	5·8	6·4	6·1	4·1	5·8	4·9	8·4	4·8
Ottobre	8·2	7·5	6·4	7·3	5·4	4·5	5·5	6·0	7·1	4·8
Novembre	11·7	10·6	7·2	9·4	6·9	5·3	7·1	5·0	5·7	4·3
Dicembre	14·8	13·6	8·3	11·5	8·1	6·3	8·5	8·3	5·7	4·8

(1) Dati elaborati dall'A. per Trieste, Firenze, Roma e Cagliari; ricavati dal PRINZING Op. cit. per gli altri paesi. I dati assoluti, per Trieste e Cagliari, sono tolti dai *Bollettini demografici* mensili di dette città, per Firenze, dall' *Annuario statistico del Comune di Firenze*; per Roma, furono comunicati manoscritti all'A. dal Direttore dell' Ufficio di statistica municipale.

Per ottenere la mortalità nel primo mese di vita, il PRINZING ha diviso i morti in un dato mese per la semisomma dei nati in detto mese e nell' antecedente; lè'A. ha invece diviso il numero dei morti per il numero dei nati nello stesso mese. Quest 'ultimo metodo à parso preferibile, sia per la sua maggiore semplicità, sia perchè il numero dei morti in un dato mese durante i primi 30 giorni di vita deve provenire in gran parte dai nati nello stesso mese, per la rapida diminuzione della mortalità col crescure dell'età nei primi tempi dello sviluppo.

(2) Queste percentuali si riferiscono ai 6 anni 1905-907, 1909-911.

Tavola XV.—MORTALITÀ NEL PRIMO MESE DI VITA SECONDO IL MESE DI NASCITA.(1)

Mese.	Fatta = 100 la media giornaliera per tutto l'anno, la media giornallera per i singoli mesi risulta =								
	Danimarca (1901-905).			Sassonia (1901-905)					
		Morti			Morti nel giorni di vita				
	Nascite	nel 1° giorno di vita	nel resto del mese	Nascite	1°	2°-7°	8°-14°	15°-21°	22°-30°
1	2	3	4	5	6	7	8	9	10
Gennaio ...	98	93	96	99	93	99	85	72	83
Febbraio ...	103	102	*104*	103	95	101	85	78	88
Marzo ...	107	104	91	100	97	98	78	73	63
Aprile ...	107	102	106	101	*102*	*102*	83	80	80
Maggio ...	103	*115*	99	101	*118*	99	85	86	80
Giugno ...	100	*107*	100	103	*115*	*108*	*104*	*107*	*104*
Luglio ...	97	*106*	99	103	*115*	*113*	*127*	*132*	*129*
Agosto ...	100	98	*117*	100	*108*	*105*	*152*	*171*	*179*
Settembre	102	90	*117*	103	95	99	*145*	*154*	*141*
Ottobre ...	95	96	93	96	88	89	*104*	*103*	*105*
Novembre	94	93	88	95	90	88	81	75	79
Dicembre	94	94	90	96	92	99	71	69	69

(1) Dati ricavati dal ROESLE. *Die Sterblichkeit im ersten Lebensmonat* Leipzig. Vogel, 1910, Pagg. 200 e 201.

ed un secondo massimo, più debole, nei mesi più caldi dell'estate. La nati-mortalità risulterebbe dunque massima precisamente per i concepti in primavera, in perfetta contraddizione con quanto sarebbe stato da attendersi in base all'idea che la primavera costituisse in origine la stagione di riproduzione della specie umana. Se non che è molto probabile che qui sia decisiva, non la stagione del concepimento, ma la stagione del parto e che la diversa nati-mortalità, che si riscontra nei vari mesi, sia dovuta alle condizioni esterne più o meno favorevoli, anzichè ad una diversa resistenza vitale degli organismi; una prova di ciò si può vedere nella circostanza che nei paesi caldi (Sicilia, Spagna, Messico, Bengala) il massimo estivo della nati-mortalità quasi raggiunge e talora supera in intensità il massimo invernale, mentre esso scompare conpletamente nei paesi più freddi.

10. Il mese di nascita esercita un'influenza decisiva anche sulla mortalità nei primi giorni di vita, ma—circostanza a tutta prima singolare—in senso diverso da quello con cui influisce sulla nati-mortalità. In senso diverso per ciò che, mentre la nati-mortalità appare massima nell'inverno nei paesi freddi e quasi altrettanto o più alta nell'estate nei paesi caldi, la mortalità durante i primi giorni di vita risulta invece più grave nei mesi freddi in alcuni paesi relativamente caldi e più grave nei mesi caldi in paesi relativamente freddi. Il fenomeno è posto in luce dalle Tavole XIV. e XV. In Danimarca e in Sassonia, la mortalità nel primo mese di vita risulta maggiore

in estate o al principio dell'autunno; a Budapest, oltre al massimo estivo, si pronuncia, con minore intensità, un massimo invernale; in Italia, di gran lunga più nefasti ai neonati riescono i mesi freddi, mentre nell'estate vi è

Tavola XVI.—MORTALITÀ NEL PRIMO ANNO DI VITA SECONDO IL NUTRIMENTO.(1)

NUMERO MEDIO GIORNALIERO DEI MORTI NEI VARI MESI, FATTO = 1000 IL NUMERO MEDIO GIORNALIERO PER TUTTO L'ANNO.

Mese della morte	Parigi 1905-909 I bambini morti erano		Berlin, 1892-96 bambini morti erano		
	allattati al seno	nutriti-artificialmente	allattati al seno	nutriti con latte animale	nutriti con surrogati del latte
1	2	3	4	5	6
Gennaio	*1207*	927	*1170*	688	480
Febbraio	*1255*	823	*1046*	759	569
Marzo	*1114*	888	998	777	530
Aprile	*1130*	877	853	722	432
Maggio	*1011*	860	865	877	505
Giugno	953	800	884	*1074*	980
Luglio	824	*1148*	*1044*	*1872*	*2082*
Agosto	783	*1838*	*1221*	*2093*	*2821*
Settembre	884	*1245*	932	*1176*	*1680*
Ottobre	820	941	942	718	690
Novembre	934	840	979	574	637
Dicembre	*1086*	810	*1066*	671	591

(1) Dati elaborati dall'A. I dati greggi per Parigi furono ricavati dall' *Annuaire Statistique de la ville de Paris;* quelli per Berlino furono tolti dal WESTERGAARD *Die Lehre von Mortalitat. Jena Fischer,* 1901. Pag. 305.

appena traccia di un rialzo della mortalità in Luglio e in Agosto. Tali differenze sono dovute probabilmente a più cause: da una parte, nei paesi freddi, i bambini vengono riparati meglio dei rigori dell'inverno che in paesi più caldi: dall'altra, può avere decisiva influenza una diversa frequenza dell'allattamento artificiale (10), che accresce la mortalità infantile soprattutto nelle stagioni calde (Cfr. Tav. XVI.) (11).

Non è nemmeno difficile rendersi conto dell'andamento che, attraverso i mesi, presenta la nati-mortalità: la frequenza dei nati-morti dipende infatti dall'influenza che il clima esercita, non sull'organismo dei nati, ma su quello delle madri loro, e gli adulti possono, meno facilmente dei neonati, venir sottratti all, inclemenza della stagione: per ciò, nelle età adulte, la mortalità è maggiore in estate nei paesi caldi ed in inverno nei paesi freddi e la nati-mortalità segue, attraverso i mesi, lo stesso andamento.

Possiamo dire, concludendo, che le variazioni che la nati-mortalità e la mortalità nel primo mese di vita presentano secondo il mese di nascita, se non permettono di escludere che il mese del concepimento eserciti una qualche influenza sulla vitalità del nato, lasciano però affermare che una

tale influenza, se c'è, resta del tutto oscurata dall'influenza della stagione del parto.

11. Un interessante problema resta ancora da risolvere: se il mese di nascita, oltre ad avere un'influenza diretta sulla mortalità nei primi giorni della vita, ha anche un'influenza indiretta sulla resistenza organica dei sopravvissuti nel seguito della loro esistenza.

È la mortalità nel resto della vita indipendente dalla stagione di nascita? Ed, in tal caso, si fa manifesta, nelle età posteriori, una differenza di resistenza vitale in dipendenza della stagione del concepimento?

Oppure la mortalità dei primi mesi di vita ha un carattere selettivo, in modo che gli organismi più robusti, i quali sono riusciti a superare, subito dopo la nascita, più aspre condizioni di ambiente, presenteranno in seguito una mortalità minore, che a poco a poco ristabilirà l'equilibrio nella sopravvivenza?

O, invece, l'influenza nociva, o favorevole, della stagione di nascita, oltre a determinare immediatamente una maggiore o minore mortalità, si esercita anche rendendo più deboli, o viceversa più robusti, gli organismi dei sopravviventi, per modo che, anche nel seguito della vita, i nati nelle stagioni più sfavorevoli presenteranno una maggiore mortalità?

È un problema come ognuno intende che interessa non solo l'Eugenica ma anche le scienze attuariali.

Si intende però che, come è varia, nei differenti paesi, l'influenza diretta esercitata dalla stagione di nascita sulla mortalità nel primo mese della vita, così può essere varia l'influenza da essa esercitata sulla mortalità nel seguito dell'esistenza.

Tavola XVII.—MORTALITÀ SECONDO IL MESE DI NASCITA (ROMA, 1908-910).

DI 10,000 MORTI, DI CUI È NOTO IL MESE DI NASCITA, MUOIONO IN ETÀ SUPERIORE AD X.

Mese di nascita	Età (x)				
	1 anno	5 anni	20 anni	40 anni	60 anni
1	2	3	4	5	6
Gennaio	7534	*5314*	*4467*	*3543*	*1940*
Febbraio	7628	5633	4958	3829	2102
Marzo	7823	*5954*	*5108*	*4203*	*2548*
Aprile	*7854*	5790	4952	4038	2235
Maggio...	7829	5847	5150	4028	2216
Giugno...	*7280*	*5523*	4847	3856	2280
Luglio	7436	5528	*4723*	*3725*	*2101*
Agosto	7564	5628	4923	3750	2167
Settembre	*7857*	*5766*	*4957*	*3805*	2177
Ottobre	7621	5748	4935	3869	2201
Novembre	7530	5601	4795	3699	2081
Dicembre	*7433*	5511	4790	3708	2022

Io ho fatto intraprendere apposite indagini sull'età della morte secondo il mese di nascita negli Uffici municipali di Statistica di Roma e di Cagliari.

In Roma, i dati sono stati desunti dalle schede nei morti nella città, nei tre anni 1908-1910. Lo spoglio fu compiuto per gentile concessione del Comm. E. Pelissier, direttore dell'Ufficio, sotto l'intelligente direnzione de l'Avv. A. Mancini, sopraintendente ai lavori statistici del censimento.

Manca molte volte, nelle schede, l'indicazione del mese di nascita, o perchè si tratta di persone che avevano dimora occasionale in Roma, e delle quali non eravi traccia, nè nei registri di Stato civile nè nel registro della popolazione, o per lacune esistenti nel registro della popolazione, o anche, talvolta, per incompleta redazione delle schede. È pertanto impossibile costruire una vera e propria tavola di sopravvivenza secondo il mese di nascita, ma si può stabilire quanti, tra i morti, per i quali è noto il mese di nascita, avevano un'età superiore ad X. I risultati di questo calcolo sono esposti nella Tavola XVII. Si avverta che non vi è ragione di ritenere che le lacune, che si riscontrano nelle schede di morte, stieno in relazione con il mese di nascita, ed è pertanto da attendersi che, in un numero sufficientemente esteso di osservazioni, non si verifichino con frequenza sostanzialmente diversa per i nati dei differenti mesi. Quando le categorie, in cui i morti sono classificati, vengano stabilite, come è stata nostra cura di fare, in modo che il numero di osservazioni comprese in ciascuna di esse non sia troppo esiguo, si potrà quindi ritenere che la sopravvivenza ad un'età x sia, per i nati in un mese *a*, superiore che per i nati in un mese *b*, quando i deceduti che si sanno nati nel mese *a* presentano una percentuale di morti sopra l'età x superiore ai deceduti che si sanno nati nel mese *b*.

La tavola XVII. mostra che la sopravvivenza dei nati dipende in modo sensibile dal mese di nascita: essa presenta due massimi, in corrispondenza dei mesi temperati di Marzo—Aprile e di Settembre—Ottobre, e due minimi, in corrispondenza dei mesi estremi di Dicembre-Gennaio e di Guigno-Luglio. La regolarità con cui le cifre si comportano è troppo notevole perchè il risultato possa dipendere dal caso.

Nella Tavola XVIII. i dati sono stati raggruppati per stagioni di nascita, ciò che ha permesso di considerare classi di età più ristrette, senza rendere troppo esiguo il numero di casi compreso in ciascuna. Anche i risultati di questa Tavola dimostrano una regolarità veramente notevole. A tutte le età, a partire dai 3 mesi, la sopravvivenza risulta minima per i nati nell'inverno e a tutte le età, a partire dai 9 mesi, essa risulta massima per i nati in primavera. Col crescere dell'età, le differenze non si attenuano punto, ma anzi si accrescono, ciò che fa pensare che, non solo nei primi tempi, ma anche nel seguito della vita, la mortalità sia superiore alla media per i nati nell'inverno e inferiore alla media per i nati nella primavera. I

Tavola XVIII.—MORTALITÀ SECONDO LA STAGIONE DI NASCITA (ROMA, 1908-910).

DI 10,000 MORTI DI CUI È NOTO IL MESE DI NASCITA, MUOIONO IN ETÀ SUPERIORE AD X.

Età. (X)	Stagione di nascita. Inverno	Primavera	Estate	Autunno
1 mese	8624	8914	8676	9012
3 mesi	8244	8614	8352	8640
6 ,, ...	7973	8370	8115	8332
9 ,, ...	7742	8184	7842	8011
12 ,, ...	7532	7835	7431	7669
2 anni	6328	6620	6252	6470
3 ,, ...	5859	6228	5842	6039
5 ,, ...	5481	5868	5561	5705
9 ,, ...	5229	5541	5352	5372
12 ,, ...	5106	5418	5255	5310
15 ,, ...	4829	5304	5123	5201
20 ,, ...	4730	5093	4831	4895
25 ,, ...	4446	4840	4565	4605
30 ,, ...	4213	4608	4278	4329
40 ,, ...	3689	4095	3775	3820
50 ,, ...	2994	3383	3102	3122
60 ,, ...	2020	2343	2180	2152

Tavola XIX.—MORTALITÀ SECONDO LA STAGIONE DI NASCITA (ROMA, 1908-910).

PROBABILITÀ DI MORTE IN ETÀ X,—X,, SECONDO LA STAGIONE DI NASCITA FATTA = 1000 LA RISPETTIVA PROBALITÀ DI MORTE PER IL COMPLESSO DEI NATI.

Stagione di nascita	Età (X.,—X.,) 0-1 anno	1-5 anni	5-20 anni	20-40 anni	40-60 anni
1	2	3	4	5	6
Inverno	1036	1054	1011	1033	1040
Primavera	909	972	975	919	983
Estate	1079	975	969	1025	971
Autunno	979	993	1047	1030	1004

nati nell'autunno dimostrano a tutte le età, fino ai 50 anni, una sopravvivenza più forte che i nati nell'estate; ma le differenze, molto forti da principio, vanno di mano in mano attenuandosi finchè, a 60 anni, la sopravvivenza risulta più alta per i nati in estate, ciò che fa pensare che, contrariamente a quanto avviene nei primi tempi della vita, negli anni successivi

la mortalità debba essere, in generale, più forte per i nati nell'autunno che per i nati nell'estate.

Queste induzioni risultano confermate dai dati della Tavola XIX. che mostrano l'intensità relativa della mortalità in varii gruppi di età secondo la stagione di nascita(12). In tutti i gruppi di età, la mortalità risulta, per i nati nell'inverno, più alta e, per i nati nella primavera, più bassa che per il complesso dei nati. Per i nati nell'estate, la mortalità risulta molto alta nel primo gruppo di età (da O a I anno) e per lo più bassa nel resto della vita; per i nati nell'autunno, al contrario, la mortalità risulta inferiore alla media nei due primi gruppi di età e superiore alla media nei gruppi di età successivi.

La cattiva influenza che l'estate e l'inverno esercitano sull'organismo del bambino sembra dunque essere sostanzialmente diversa: la cattiva influenza dell'estate pare abbia carattere, almeno prevalentemente, selettivo, eliminando gli organismi più deboli e lasciando in vita organismi che, nel resto dell'esistenza, mostreranno una mortalità inferiore alla media; la cattiva influenza dell'inverno pare invece che abbia carattere permanente, nel senso che, non solo conduce a morte molti bambini, ma indebolisce anche gli organismi di quelli che sopravvivono. La differenza si spiega pensando che sono diverse nell'estate e nell'inverno le cause di malattia e di morte dei bambini. Il pericolo dell'estate dipende essenzialmente dalle malattie del sistema digerente, malattie acute nel senso che, superata la malattia, l'organismo non ne resta indebolito permanentemente. Il pericolo dell'inverno è invece dovuto ad una maggiore gravità che assumono gli altri disturbi, in particolare quelli più o meno strettamente connessi con l'immaturità o il non completo sviluppo del neonato (13): è pertanto naturale che, tra i nati nell'inverno, almeno nei paesi in cui questi non sono convenientemente riparati dal rigore della stagione, non solo un forte numero di organismi venga a morte, ma anche molti altri, pur sopravvivendo, non possano rimettersi dalla debolezza congenita, come sarebbe avvenuto in altre stagioni.

Le stagioni favorevoli alla vita del nato durante i primi tempi del suo sviluppo mostrano differenze analoghe a quelle riscontrate per le stagioni nocive: l'influenza favorevole della primavera appare permanente; quella dell'autunno contro-selettiva. Entra qui in gioco un'influenza della stagione del concepimento? Mi parrebbe azzardato affermarlo. O interviene piuttosto l'influenza della differente stagione in cui normalmente si slattano i nati in primavera e i nati in autunno? È noto che il cambiamento di dieta, che avviene nel momento dello slattamento, ha molta importanza per la salute del bambino: ora, se i nati in autunno di regola, o almeno molto più frequentemente dei nati in primavera, venissero slattati in estate, la stagione pericolosa per le malattie intestinali, si potrebbe vedere

qui una circostanza che compromette la loro salute; ma se il fatto realmente si verifichi e quale possa essere la sua portata sulla resistenza vitale dell'organismo nei periodi successivi della vita, non mi è dato di decidere.

Tavola XX.—MORTI SECONDO LA STAGIONE DI NASCITA (CAGLIARI, NATI NEGLI ANNI 1902-1911).

MEDIA ANNUA DEI NATI E DEI MORTI NELLE VARIE STAGIONI.

	Anni della nascita	Stagione di nascita				Numero totale delle osservazioni
		Inverno	Primavera	Estate	Autunno	
Nati (vivi e morti)	1905-911	421	381	369	396	1566
Nati nel mese x e morti prima del 6 del mese x + 3 ...	1902-911	24·5	14·2	15·4	18·3	724
Morti nell'anno dopo	1902-910	37·2	35·2	34·2	36·0	1284
Morti due anni dopo	1902-909	22·1	17·0	15·9	18·9	591
Morti tre anni dopo	1902-908	7·0	8·1	6·1	7·0	198
Morti quattro anni dopo ...	1902-907	4·2	5·0	2·3	3·8	94
Morti cinque anni dopo ...	1902-906	1·8	2·8	1·8	2·8	46
Morti sei anno dopo	1902-905	2·0	2·7	2·2	2·2	37
Morti sette anni dopo	1902-904	1·3	2·3	2·7	1·3	23

Tavola XXI.—MORTALITÀ SECONDO LA STAGIONE DI NASCITA (CAGLIARI, NATI NEGLI ANNI 1902-911).

MEDIA GIORNALIERA DEI NATI O DEI MORTI SECONDO LA STAGIONE DI NASCITA FATTA = 100 LA MEDIA GIORNALIERA RISPETTIVA DEI NATI O DEI MORTI PER TUTTO L'ANNO.

	Stagione di nascita			
	Inverno	Primavera	Estate	Autunno
1 Nati	109	97	93	101
2 Morti entro il 6 del 3° mese dopo la nascita ...	136	78	84	101
3 Morti nel 1° anno successivo	106	98	95	101
4 Morti nel 2° anno successivo	121	91	85	103
5 Morti nel 3°-7° anno successivo	95	120	86	99
6 Morti nel 1°-7° anno successivo	107	102	91	101
7 Morti in tutti e 4 i periodi	116	95	89	101

I dati per Cagliari, sono, per estensione e compiutezza, molto meno importanti di quelli per Roma. Essi furono ricavati dallo spoglio dei registri delle nascite eseguito dagli impiegati del Movimento dello Stato Civile, sotto la direzione del Cav. Medda Sechi, segretario dello Stato Civile.

Nei registri delle nascite della Città di Cagliari, accanto alla data di nascita, viene indicata la data della morte della persona, sia che il decesso sia avvenuto in città, sia che sia avvenuto altrove. Molte volte però questa indicazione dovette venir tralasciata. Il numero dei morti alle varie età, risultato dallo spoglio, è infatti incompatibile con quello portato dalle statistiche delle morti. Tuttavia, poichè le lacune sono certamente indipendenti dal mese di nascita, pare non privo di interesse esporre i risultati ottenuti.

Furono considerati i nati degli anni 1902-191, morti prima del 7 Marzo 1912. I morti furono classificati per età in 8 categorie, secondo che il decesso è avvenuto: entro il 6 del terzo mese dopo quello di nascita, nell'anno seguente a questo termine, nel 2.o, 3.o, 4.o, 5.o, 6.o, 7.o, anno dopo. Per esempio, i nati nel Dicembre, 1902, premorti al 7 Marzo, 1912, furono classificati secondo che erano morti entro il 6 Marzo 1903, dal 7 Marzo 1903 al 6 Marzo 1904, dal 7 Marzo 1904 al 6 Marzo 1905, dal 7 Marzo 1905 al 6 Marzo 1906, ... dal 7 Marzo 1911 al 6 Marzo 1912 Si intende che, più l'anno di nascita è recente e minore è il numero delle categorie di età per cui si possono avere dati; le nascite del 1902 potranno fornire dati per tutte le 8 categorie di età, quelle del 1911 per una categoria soltanto.

La Tavola XX. contiene le medie annuali dei nati (1905-1911) e dei morti, per le varie categorie di età, secondo la stagione di nascita; e la Tavola XXI. le medie giornaliere dei nati e dei morti per le varie categorie di età, secondo la stagione di nascita, fatta = 100 la media giornaliera relativa a tutto l'anno. In questa tavola, parve opportuno, data la ristrettezza dei dati, riunire in una sola le ultime 5 categorie di età.

Dalla Tavola XXI., si vede come, fra i nati in inverno, il numero dei morti entro il 6 del 3.o mese dopo (linea 2) sia più che proporzionale al numero dei nati (linea 1); negli anni successivi (linea 3—5), invece, il numero dei morti è ora più ora meno che proporzionale al numeri dei nati; ma, nel complesso (linea 6), risulta meno che proporzionale.

Il contrario avviene per i nati in primavera. Per i nati in estate, il numero dei morti risulta meno che proporzionale al numero dei nati, e, per i nati in autunno, presso che proporzionale in tutti i periodi.

Se si considerano globalmente le morti dei quattro periodi (linea 7), il loro numero risulta proporzionale al numero delle nascite, per i nati in autunno, più che proporzionale per i nati in inverno e meno che proporzionale per i nati in primavera e in estate.

In complesso, per i nati di tutte le stagioni, pare che vi sia una compensazione tra la mortalità dei primi 3 mesi di vita e la mortalità dei 7 anni

successivi, non sufficiente però a rendere la sopravvivenza, allo spirare di questo termine, uguale per i nati nelle diverse stagioni.

Questi risultati per Cagliari discordano in parecchi punti da quelli per Roma. Non è certo da attendersi, come dicevamo, che l'influenza delle stagioni di nascita sulla mortalità nel seguito della vita si esplichi nello stesso senso e nella stessa misura in tutti i paesi: i venti violenti che turbano la primavera e le brezze che attenuano di molto i calori estivi

Tavola XXII.—UOMINI ILLUSTRI E SENATORI ITALIANI SECONDO LA STAGIONE DI NASCITA.

Nazionalità	Stagione di nascita: Inverno	Primavera	Estate	Autunno	Complessivamente.
Scrittori contemporanei (De Gubernatis).					
1 Italia	*268*	240	*203*	243	954
2 Francia e Belgio ...	*433*	412	*354*	394	1593
3 Spagna e Portogallo	18	*24*	*14*	*24*	80
4 Austria - Ungheria e Svizzera ...	*181*	144	*141*	144	610
5 Germania	*298*	296	262	*221*	1077
6 Inghilterra e Stati Uniti	*105*	77	84	97	363
7 Danimarca, Olanda, Svezia, Norvegia	*38*	30	29	38	135
Complessivamente ...	*1382*	1246	*1109*	1186	4923
Media giornaliera, fatta = 1,000 la media giornaliera, dell'anno	*1136*	*1004*	*894*	*967*	*1000*
Uomini illustri (Mantegazza).					
8 Varie nazionalità ...	*1000*	747	*680*	828	3255
Senatori Italiani (1848-1912).					
9 Italia	377	380	*373*	*404*	1534 [1]
Totale delle osservazioni.					
Complessivamente ...	2759	2373	*2162*	2418	9712
Media giornaliera fatta = 1,000 la media giornaliera dell'anno	*1150*	*970*	*884*	*999*	*1000*

[1] Mancano notizie per 37 Senatori.

possono in particolare spiegare come per Cagliari la stagione più favorevole risulti l'estate. In ogni modo però riteniamo che la ristrettezza delle osservazioni e le numerose lacune nelle indicazioni consiglino di accettare i risultati per Cagliari con molta riserva.

12. La questione dell'influenza del mese di nascita sui caratteri umani potrebbe venir risolta, non solo per ciò che riguarda la sopravvivenza, ma anche per i caratteri fisici, intellettuali, morali, esaminando in quale mese sono nate le persone che, per i varii caratteri, si allontanano, in senso buono o cattivo, dal normale (centenarii, scienziati, artisti, uomini politici,

atleti, pazzi, delinquenti, etc.) Le schede dei censimenti, opportunamente controllate coi dati dello Stato civile, i dizionari degli uomini illustri, i registri dei manicomi e delle carceri, gli elenchi dei membri del Parlamento, potrebbero fornire larga messe di dati per tali ricerche.

I risultati che io posso portare, più che a risolvere in qualche punto la questione, dovrebbero servire a invogliare altri a proseguire le indagini con materiale più ampio e più variato (Cfr. Tav. XXII.).

Una parte dei risultati deriva dallo spoglio del *Dictionnaire international des ecrivains du jour* (Florence. Niccolai, 1891), del DE GUBERNATIS, accuratamente eseguito dal dott. E. PORRU. I dati riguardano circa 5,000 scrittori distinti in 7 gruppi secondo gli Stati in cui nacquero.

Un'altra parte dei risultati deriva dall'esame delle notizie biografiche dei Senatori italiani, appositamente eseguito presso la Segreteria del Senato dal Dott. Luigi Ferrari, vice-bibliotecario del Senato. Le notizie riguardano tutte le persone elevate al laticlavio dal 1848 al 1912, sia che abbiano accettato, sia che abbiano rifiutato la carica o che per esse il decreto non abbia avuto corso. Si ignora il mese di nascita solo per 37 Senatori.

Altri dati infine furono pubblicati dal Mantegazza (14) e riguardano un materiale, forse un po' eterogeneo, ma abbastnza abbondante (3255 osservazioni), relativo a persone, che per qualsiasi titolo, si possono considerare illustri.

Si hanno cosi, in tutte, 9 serie di dati. In 7 di queste, il numero maggiore delle persone è nato in inverno e, pure in 7, il numero minore è nato in estate: quando il massimo non cade in inverno, esso cade in primavera o in autunno, non mai in estate; e quando il minimo non cade in estate, esso cade in autunno o in primavera, non mai in inverno. Si può dunque concludere che le nascite di persone eminenti avvengono con maggiore frequenza in inverno e con minore frequenza in estate. Se noi riuniamo insieme le 9 serie di dati (ciò che d'altra parte porta certo a qualche ripetizione) troviamo che le nascite nell'inverno stanno a quelle dell'estate come 1150 a 884.

La differenza dipende certo, almeno in buona parte, dalla diversa frequenza delle nascite nelle varie stagioni, che, in Europa, a cui si riferisce la grande maggior parte dei nostri dati, presentano un massimo in inverno ed un minimo in estate. Ma essa sembra più forte di quanto non sia per le nascite in generale.

Può darsi certo che ciò dipenda dal numero limitato delle osservazioni. Si osservi però che il vantaggio dell'inverno e lo svantaggio dell'estate risultano dubbi per la serie dei senatori, notevoli per la serie degli scrittori del giorno, altissimi per la serie delle persone a dirittura illustri. Non vien fatto di sospettare che questa graduatoria stia in correlazione con una graduatoria di dignità che si potrebbe stabilire fra le tre serie? Gli uomini illustri constituiscono certo le persone che più emergono per facoltà intellettuali; ad essi vengono dopo gli scrittori contemporanei, che non sempre

meriteranno il brevetto della celebrità; ultimi nella graduatoria porrei i senatori italiani, perchè, per quanto, di fronte alla comune degli uomini, essi rappresentino sempre il frutto di una selezione, tuttavia molto spesso vengono scelti, come è noto, più per meriti amministrativi o politici, o per requisiti finanziarii che per eminenti caratteri intellettuali.

Questi risultati vanno accolti con grande riserva, tanto più che non erano punto prevedibili in base alla conclusione negativa a cui in altre ricerche eravamo giunti sull'influenza della stagione del concepimento sul carattere

Tavola XXIII.—INFLUENZA DELLA STAGIONE DI NASCITA SULLO SVILUPPO FISICO RAGGIUNTO A 11 ANNI (MIDDLESBROUGH.

Mese di nascita	Numero delle osservazioni	Statura media in pollici	Peso medio in libbre
Gennaio-Marzo	83	51·6	61·45
Aprile-Giugno	82	50·62	60·84
Luglio-Settembre	92	49·95	57·89
Ottobre-Dicembre	79	50·33	57·88

Tavola XXIV.—INFLUENZA DELLA STAGIONE DI NASCITA SULLA SOPRAVVIVENZA ALLA FINE DEL 6° E DELL' 11° ANNO DI VITA (MIDDLESBROUGH).

Mese di nascita	Alla nascita		Sopravviventi alla fine del 6° anno		Sopravviventi alla fine del 11° anno	
	Numero assoluto	per 1000	Numero assoluto	per 1000	Numero assoluto	per 1000
Gennaio-Giugno... ...	3600	*519*	2320	*559*	3040	*597*
Luglio-Dicembre ...	3340	*481*	1860	*441*	2060	*403*

dei nati. Ma, se indagini più estese, venissero a confermarli, converrebbe dire che, nella stagione in cui i concepimenti sono in Europa più frequenti, è anche più facile la concezione di persone eminenti per qualità intellettuali, e che il contrario avviene per la stagione in cui i concepimenti sono più rari.

L'Ewart, come fu ricordato, ritenne di avere accertato un'influenza favorevole della primavera e, subordinatamente, dell'estate sui caratteri fisici dei concepiti. Riporto qui le sue tavole (Tavole XXIII. e XXIV.). Il numero delle osservazioni, per ciò che riguarda il peso e la statura, è certamente troppo esiguo; ed arbitraria appare la distinzione delle nascite in due semestri, per cio che riguarda la sopravvivenza dei nati. Si aggiunga

che non è ben chiaro come sieno stati rilevati i dati della Tavola XXIV.: il numero assoluto dato per i sopravviventi a 11 anni è maggiore di quello dato per i sopravviventi a 6 anni e il numero assoluto dei nati (6940) pare troppo alto per der luogo a soli 4180 sopravviventi a 6 anni ciò fa pensare che le persone considerate alla nascita non sieno le stesse di quelle considerate a 6 o a 11 anni.

Se i sopravviventi a 6 anni e i sopravviventi a 11 anni provengono da nati in anni diversi, sarebbe stato necessario paragonare separatamente le percentuali relative ai sopravviventi a 6 anni con le percentuali relative ai nati di 6 anni prima e le percentuali relative ai sopravviventi a 11 anni con le percentuali ai nati di 11 anni prima.

13. Riassumiamo i risultati ottenuti in questo capitolo. L'idea che in primavera si avveri un massimo naturale di concepimenti, in dipendenza di una maggiore fecondità dell'uomo e come residuo atavico di una primitiva stagione di riproduzione, se sembrava adatta a spiegare la periodicità delle nascite attraverso i mesi in Europa, non trova però sostegno nei dati che si sono potuti raccogliere per altri paesi.

La frequenza dei parti plurimi, degli aborti, dei nati-morti secondo i mesi e della mortalità secondo il mese di nascita non permette di apprezzare un'influenza del mese di concepimento sui caratteri dei nati. Alcune ricerche dell'Ewart sulla statura dei fanciulli secondo il mese di nascita ed altre sopra il mese di nascita degli uomini illustri mostrerebbero per vero un'influenza favorevole della primavera sullo sviluppo fisico e sulle qualità intellettuali dei concepiti; ma le ricerche dell'Ewart si fondano su un numero di osservazioni troppo esiguo e l'influenza del mese di nascita sulla frequenza degli uomini illustri non è così netta da potersi ammettere senza altre indagini.

È invece accertata un'influenza dannosa delle stagioni di nascita eccessive (inverno ed estate) sulla vitalità del neonato: i concepiti in primavera, nascendo nell'estate, si trovano pertanto sottoposti, nei primi tempi della loro vita, a cattive condizioni di ambiente, che, almeno in Roma, non solo accrescono la loro mortalità immediata, ma anche sembrano diminuire la loro resistenza vitale per il resto dell'esistenza.

Non vi è pertanto ragione di ritenere che la circostanza che la specie umana si riproduce in tutti i periodi dell'anno eserciti *direttamente* conseguenze dannose sui caratteri dei nati: è anzi probabile che, se l'uomo si riproducesse soltanto in primavera, come avviene in molte specie animali superiori, i figli suoi, nascendo in inverno, si troverebbero, almeno nei paesi dove la difesa del freddo non è molto perfezionata, in condizioni più svantaggiose di quanto oggi non avvenga.

Tavola VIII.

NUMERO DEI CADETTI SECONDO L'INTERVALLO DALLA NASCITA ANTECEDENTE. (1)

Intervallo dalla nascita antecedente	Chemnitz (1904-905)		Inghilterra Class elevate (1874) (2)		Impiegati delle amministrazioni centrali dei ministeri Francesi (1905)		Cantonieri della città di Parigi (1905)		Operai della città ei Parigi (1905)		Complessivamente	
	Numero dei nati	Percentuale sul totale	Numero dei nati	Percentuale sul totale	Numero dei nati	Percentuale sul totale	Numero dei nati	Percentuale sul totale	Numero dei nati	Percentuale sul totale	Numero dei nati	Percentuale sul nati
1	2	3	4	5	6	7	8	9	10	11	12	13
1 anno o meno	514	*4·6*	1949	*9·1*	12	*1·1*	212	*1·9*	145	*2·2*	369	*2·6*
1-2 anni	6118	*53·2*	12415	*58·3*	213	*19·5*	1945	*17·5*	1177	*18·1*	3335	*17·9*
Meno di 2 anni	6632	*57·7*	14364	*67·4*	225	20·6	2157	*19·5*	1322	*20·4*	3704	*19·9*
Totale	11498	*100·0*	21302	*100·0*	1094	*100·0*	11086	*100·0*	6477	*100·0*	18657	*100·0*

(1) Idati per Chemnitz sono stati desunti dall'.A. dalle *Monatliche Mitteilun en* di detta città ; quelli per l'Inghilterra sono tolto dal WESTERGAARD. Op. cit. Pag. 371 e furono ricavati da questo A. da CH. ANSELL *Statistics of Families* 1874 ; quelli per la Francia sono stati desunti dall'A. dal *Rapport préliminaire de la Commission statistique des fonctionnaires Rapports au Conseil supérieur de statistique* Bulletin numero 10 Paris Imprimerie Nationale 1908.

(2) Anno della pubblicazione da dati.

CAPITOLO III°.

Dell'intervallo tra i parti successivi.

14. Se la possibilità di generare in ogni stagione dell'anno direttamente non può esercitare, come si è visto, alcuna influenza nociva sulla resistenza vitale dei figli dell'uomo, essa può però avere conseguenze dannose indirettamente, in quanto permette che le gravidanze si susseguano a intervalli troppo brevi.

Un'altra circostanza concorre, in molte razze incivilite, a questo risultato: l'abitudine di interrompere l'allattamento prima del suo termine naturale,

Tavola XXVI.—MORTALITÀ INFANTILE SECONDO L'INTERVALLO TRA LA NASCITA E LA NASCITA PRECEDENTE, INGHILTERRA, FAMIGLIE AGIATE. (1)

Ordine di nascita	Intervallo tra la nascita e la nascita precedente		
	1 anno e meno	1-2 anni	più di 2 anni
Morti nel 1° anno di vita per 100 nati			
2	16	7	6
3	15	8	6
4	15	9	6
5-6	16	9	7
7-9	12·5	10	9
10 e più	20	13	10
Tutti i cadetti	*15·3*	*8·9*	*7·2*
Morti nei primi 5 anni di vita per 100 nati			
2	20	12	11
3	19	12	11
4	20	14	10
5-6	21	14	11
7-9	18	15	14
10 e più	23	18	15
Tutti i cadetti	*19·9*	*13·6*	*11·8*
Morti nel 2°-5° anno di vita per 100 sopravviventi a 1 anno			
Tutti i cadetti	*5·3*	*5·1*	*5·0*

(1) Idati di questo tavola sono ricavati dal WESTERGAARD. Op. cit Pag 371. Che li ha desunti a sua volta dalle *Statistics of families* (1874) *di* CH. ANSELL.

ciò che antecipa il riapparire della mestruazione e quindi la possibilità di un nuovo concepimento(15).

Se la specie umana, come le specie animali superiori, fosse monomestruata, e se concedesse all'allattamento quel tempo che la natura richiederebbe, rimarrebbero escluse le nascite con un intervallo dalle precedenti inferiore a due anni. La gravidanza infatti dura, come è noto, nove mesi e il riapparire della mestruazione, quando l'allattamento non viene interrotto, sembra avvenire costantemente più di tre mesi dopo il parto(16).

Nella razza bianca, invece, pare, dai dati che finora si hanno, che più di una metà dei cadetti venga alla luce prima che siano trascorsi due anni dalla nascita antecedente: la percentuale risulta del 58% in Chemnitz, del 67% nelle famiglie inglesi agiate: molto più bassa per vero si trova negli impiegati della Francia (20%), probabilmente in connessione con le condizioni demografiche tutte particolari in cui versa la nazione francese (Cfr. Tav. XXV.).

D'altra parte, non sono dubbie le consequenze dannose che, sulla resistenza vitale dei bambini, almeno nel primo anno di vita, esercita un troppo breve intervallo dalla nascita antecedente. Ne fanno fede i dati della Tavola XXVI. Nè vi sarebbe da meravigliarsi se ricerche sufficientemente estese confermassero i risultatì dell'Ewart (basati per vero su un numero troppo ristretto di osservazioni), secondo i quali altezza, peso, capacità intellettuale dei bambini a 6 anni, sarebbero più o meno sensibilmente inferiori quando è stato breve l'intervallo dalla nascita antecedente (Cfr. Tavola XXVII.).

Tavola XXVII.—SVILUPPO FISICO E INTELLETTUALE DEI BAMBINI A 6 ANNI SECONDO L'INTERVALLO TRA LA LORO NASCITA E LA NASCITA ANTECEDENTE (MIDDLESBOURG)(1).

Intervallo tra la nascita e la nascita antecedente	Carratteri fisici			Caratteri intellettuali			
				Figli di genitori aventi entrambi da 25 a 35 anni		Bambini appartenenti alle classi agiate	
	Numero delle osservazioni	Statura media in pollici	Peso medio in libbre	Numero delle osservazioni	Percentuale dei bambini classificati nella categoria dei più intelligenti	Numero delle osservazioni	Percentuale dei bambini classificati nella categoria dei più intelligenti
Meno di 2 anni ...	156	*38·6*	*37·2*				
2—2·5 ,, ...	180	*39·9*	*38·8*	217	*31*	137	*37*
2·5—3 ,, ...	172	*40·3*	*39·1*				
3 anni e più	154	*41·7*	*39·4*	85	*32*	85	*42*

(1) Dati ricavati da R. J. Ewart. *The influence of parental age on offspring.* (*The Eugenics Review*, Vol. III., No. 3, October, 1911.) Pagg. 211-220.

Non conviene però esagerare il miglioramento che alla razza deriverebbe da un più lungo intervallo tra i parti: se questo fosse sempre superiore a 2 anni, la mortalità, nel primo anno di vita, scenderebbe, secondo i dati di Ansell, da 8.9 a 7.2% nati e, nei quattro anni seguenti, appena da 5.1 a 5.0% sopravviventi ad un anno.

NOTE.

(1)—Ecco precisamente il numero dei sopravviventi a 20 anni su 10,000 nati in codesti paesi:

Tavola di sopravvivenza dell'		Anni a cui si riferisce la tavola di sopravvivenza	Su 10,000 nati sopravvivono a 20 anni
INDIA ...	Maschi	1901	4516
„ ...	Femmine	„	4519
SPAGNA ...		1880–84	4960
IRLANDA ...		1881–90	7767
DANIMARCA...	Maschi	1895–900	7671
„ ...	Femmine	„	7855
SVEZIA ...		1891–900	7816
NORVEGIA ...	Maschi	1891/92–1900/901	7770
„ ...	Femmine	„	7997
AUSTRALIA OCC.	Maschi	1899–902	7727
„ „	Femmine	„	8075

Cfr. *Statistique internationale de la population* pubblicata dalla *Statistique Générale de la France*. Paris. Imprimerie nationale, 1907.

(2)—A 4 anni sopravviverebbero precisamente 90,645 cavalli su 100,000 nati. Cfr. FELIPE CARAMANZANA. *Ensayo de una "Tabla de Mortalidad" de los équidos domesticos*. Congreso de las ciencias de Valencia. Sección actuarial, pubblicato in *Boletin Oficial de Seguros. Ministerio de Formento*. Año I. Núm. 12. 30 Junio, 1910. Madrid, R. Rojas, 1910.

(3)—Dalle tavole di mortalità riportate nella citata *Stat. internat. de la population*, ricavo che la sopravvivenza massima a un anno di vita è di 9054 su 10,000 nati in Irlanda (1881-90) e di 8947 su 10,000 nati maschi e 9132 su 10,000 nati femmine in Norvegia (1891/92—1900/901). La sopravvivenza minima ad un anno è data dalla Baviera (1881-90) con 7163, dalla Sassonia (1900) con 7232 e dall'India (1901) con 7146 sopravviventi su 10,000 nati, tra i maschi, e con 7412 tra le femmine. Anche minore sarebbe la sopravvivenza ad un anno nella popolazione indigena dell'Egitto, secondo i dati dell'*Annuaire Statistique de l'Egypte, 1911. Ministère des finances. Direction de la Statistique. Le Caire. Imprimerie nationale*, 1911. Dal 1902 al 1910, i morti al di sotto di un anno rappresentano il 28.94 % dei nati negli stessi anni.

(4)—Ecco i coefficienti di mortalità da 1 a 17 anni, secondo i calcoli del Caramanzana e secondo le osservazioni della "Società Scandinava di assicurazioni sul bestiame."

Età in anni	Mortalità dei cavalli secondo	
	il Caramanzana	la Società Scandinava di assicurazioni sul bestiame
1	2·10	1·98
2	2·20	1·32
3	2·30	1·34
4	2·40	1·60
5	2·50	1·85
6	2·60	2·01
7	2·70	2·21
8	2·85	2·47
9	3·00	2·54
10	3·15	2·90
11	3·30	2·82
12	3·45	3·28
13	3·60	3·40
14	3·75	3·94
15	4·00	4·03
16	4·50	4·03
17	5·00	4·15

La differenza apparirebbe alquanto maggiore se si potesse tener conto della circostanza che i coefficienti della Società Scandinava comprendono anche i cavalli divenuti invalidi e risultano quindi un po' più elevati che se si riferissero alla sola mortalità. Il numero dei cavalli assicurati era di 6,000 alla fine del 1892, di 39,000 alla fine del 1895, di 62,000 alla fine del 1900, di 101,000 alla fine del 1905 e di 105,500 alla fine del 1910. Cfr., per ulteriori notizie, l'articolo *L'assurance du bétail en Suède et les nouvelles tables de mortalité des chevaux. Bulletin du Bureau des institutions économiques et sociales* II. année. Numéro 8. 31 Aóut, 1911. Rome. Imprimerie de la Chambre des deputés, 1911.

(5)—Cfr., per questi dati, H. Westergaard. *Die Lehre von der Mortalität und Morbilität.* Jena Fischer, 1901. Pagg. 402-403 e 489.

(6)—Bisogna naturalmente considerare, per le due specie, categorie di età comparabili; ora si può ritenere che, durante lo sviluppo, cinque anni nell'uomo equivalgano ad un anno nel cavallo.

In Germania (1900 e 1907) e nel Lussemburgo (1901, 1904 e 1907), i censimenti diedero cumulativamente un numero di cavalli sotto l'anno di 422,724; il numero cumulativo delle nascite denunciate nei 12 mesi anteriori ai censimenti fu di 440,547; il totale dei nati in un anno sta al totale dei censiti sotto l'anno come 100 a *96*. In Italia, il censimento del 1901 accertò 4,116,511 persone sotto 5 anni; nel quinquennio 1896-900 si ebbero

5,423,361 nascite; il totale dei nati nel quinquennio sta al totale dei censiti sotto i 5 anni come 100 a *76*.

In Ungheria (1895), in Germania (1900 e 1907) e nel Lussemburgo (1901, 1904, e 1907), i censimenti diedero, in media, 407,531 cavalli sotto l'anno e 398,150 da 1 a 2 anni; i censiti da 1 a 2 anni stanno ai censiti sotto l'anno come *98* a 100. In Italia, le persone censite da 5 a 10 anni nel 1901 (3,564,781) stanno alle persone censite sotto i 5 anni (4,116,511) come *86.5* a 100.

In Norvegia (1900 e 1907), Danimarca (1893, 1898 e 1903), Belgio (1900-908), Ungheria (1895), Germania (1900, 1904, e 1907), e Lussemburgo (1901, 1904 e 1907), i censimenti diedoro, in media, 492,133 cavalli sotto l'anno e 912,000 da 1 a 3 anni; i censiti da 1 a 3 anni stanno ai censiti sotto l'anno come *185* a 100. In Italia, le persone da 5 a 15 anni censite nel 1901 (6,953,479) stanno e quelle sotto i 5 anni come *169* a 100.

In Germania (1900, 1904 e 1907), Lussemburgo (1901, 1904 e 1907), Serbia (1890 e 1900) e Bulgaria (1900 e 1905), i censimenti diedero, in media, 256,527 cavalli sotto l'anno e 709,524 da 1 a 4 anni. Il numero dei censiti da 1 a 4 anni sta al numero dei censiti sotto l'anno come *277* a 100. In Italia, le persone censite nel 1901 dai 5 ai 20 anni si possono calcolare a 9,970,600; esse stanno a quelle sotto 5 anni come *242* a 100.

Si comprende come questi confronti sieno tutt'altro che rigorosi; l'influenza delle migrazioni degli uomini, delle importazioni e delle esportazioni dei cavalli, delle variazioni nel numero delle nascite delle due specie non lasciano loro che il valore di grossolane approssimazioni, di cui però riesce impossibile misurare la latitudine.

Per i dati sulla popolazione italiana, Cfr. *l'Annuario statistico italiano* 1905-907. Fasc. 1.) Roma, Bertero, 1907; per i dati sulla popolazione equina dai varii stati, Cfr. la *Statistique des superficies cultivées, de la production végétale et du bétail dans les pays adhérents* pubblicate dall'*Istituto Internazionale di Agricoltura*. Roma. Tipografia della Camera dei Deputati, 1910.

(7)—R. J. EWART. *The influence of parental age on offspring. The Eugenics Review*. Vol. III., N. 3, Octobre, 1911.

(8)—I dati della Tavola III. e V. sulla Groenlandia riconducono al suo giusto valore l'affermazione di F. COOK (*Journal of Gynecology and Obstetrics*. New York, 1894) che, fra gli Esquimesi, la passione sessuale si arresta durante le tenebre dell'inverno, di modo che le nascite si avrebbero nove mesi dopo il sorger del sole; e mostrano ancora una volta quanto sia pericoloso fondarsi su impressioni individuali per giudicare dell'andamento di fenomeni collettivi. Cfr. HAVELOCK ELLIS *Etudes de psychologie sexuelle*. III.

(9)—Per esempio, se le statistiche ci dicono che un aborto venne espulso in Dicembre e che la sua durata di gestazione era di 2-3 mesi, resterà incerto se il mese del concepimento sia stato l'Ottobre o il Settembre. Similmente, se le statistiche ci dicono che un aborto venne espulso in

Dicembre e che la sua durata di gestazione era di 2 mesi circa (vale a dire più vicina a 2 mesi che a 1 o a 3), potrà darsi che il concepimento sia avvenuto in Ottobre, in Settembre o in Novembre.

L'Annuario di Vienna dà le seguenti categorie per la durata della gestazione degli aborti e nati-morti: meno di 1 mese; 1-2 mesi, 2-3 mesi, ... 8-9 mesi, 9-10 mesi, a termine. Nella classificazione degli aborti e nati-morti secondo il mese del concepimento, gli aborti con una durata di gestazione tra x e x + 1 mesi espulsi nel mese y, furono attribuiti per una metà ai concepimenti del mese y—x e per una metà ai concepimenti del mese y—x—1: i nati morti a termine partoriti nel mese y furono attribuiti tutti ai concepimenti del mese y—9. Per esempio, gli aborti di 2-3 mesi di gestazione espulsi in Dicembre furono ritenuti concepiti per metà in Ottobre e per metà in Settembre, i nati-morti a termine del Dicembre furono ritenuti concepiti tutti in Marzo.

L'Annuario di Budapest dà le seguenti categorie per la durata della gestazione degli aborti: 1 mese, 2 mesi, 3 mesi, ... 7 mesi, Nella classificazione degli aborti secondo il mese del concepimento, gli aborti con una durata di gestazione di x mesi espulsi nel mese y, furono attribuiti ai concepimenti del mese y—x. Per esempio, gli aborti, di 2 mesi di gestazione espulsi in Dicembre furono ritenuti concepiti in Ottobre.

L'Annuario di Budapest dà poi separatamente i nati-morti per mesi, senza distinzione della loro durata di gestazione: fu ritenuto che la gestazione fosse sempre di 9 mesi, ciò che corrisponde certamente al vero nella maggior parte dei casi.

(10)—Ecco le percentuali dei morti nel primo mese di vita secondo il modo del loro nutrimento in Trieste, Budapest e Berlino.

Nutriti di cui è noto il sistema di nutrimento	Trieste 1910	Budapest 1903-905	Berlino 1904-905
al seno	72·1	63·4	33·0
altrimenti in parte o in tutto ...	27·9	36·6	67·0

Mi mancano dati simili per la Sassonia, la Danimarca e l'Italia; ma si può affermare con sicurezza che il nutrimento artificiale dei bambini ha in Italia scarsa diffusione.

(11)—I dati della Tavola XVI. si riferiscono ai morti nel primo anno di vita; per i morti nel primo mese di vita, si sarebbero ottenuti certamente risultati simili. Per Berlino, gli *Annuari statistici* portano il numero dei morti per malattie degli organi digerenti nel primo anno di vita distinti secondo i mesi di età e secondo che sono morti in estate o nelle altre stagioni. Per il biennio 1904-1905, i morti in estate rappresentavano, tra i morti dell'anno, le percentuali seguenti:

Nutriti	Morti nel I. mese di vita	Morti nel I. anno di vita
al seno	33·0	37·2
con latte animale (*)	52·2	64·5
con surrogati (*)	56·5	67·3

(*) in tutto o in parte.

Come si vede, la mortalità per malattie degli organi digerenti è più forte in estate per i bambini nutriti artificialmente, sia nel primo mese, sia nel primo anno di vita. Ed è noto, d'altra parte, che i disturbi degli organi digerenti costituiscono una della peggiori conseguenze dell'allattamento artificiale.

Non vi è ragione di credere, d'altra parte, che questi dati, come quelli della Tavola XVI., possano essere sensibilmente perturbati da una diversa frequenza dei varii sistemi di nutrimento nelle diverse stagioni.

Si intende però che l'influenza del nutrimento artificiale sull'andamento della mortalità secondo i mesi debba essere più forte per i morti nel primo anno che per i morti nel primo mese di vita, in causa della minore diffusione che nel primo mese di vita ha l'allattamento artificiale. Ecco le percentuali dei morti in Berlino (1904-905) nel primo mese o nel primo anno di vita secondo il modo di nutrimento:

Nutriti	Morti nel I. mese di vita	Morti nel I. anno di vita
al seno	21·5	9·4
on latte animale (*)	62·1	70·6
con surrogati (*)	16·4	20·0
Totale	100·0	100·0

(*) in tutto o in parte.

Similmente l'influenza del nutrimento artificiale sull'andamento della mortalità per mesi sarà, nei primi giorni del primo mese, minore che nei successivi. Ciò spiega come i massimi estivi della mortalità infantile in Sassonia e in Danimarca (Cfr. Tav. XV.) risultino, nei primi giorni di vita, meno alti e meno tardivi (nei bambini nutriti artificialmente la mortalità risulta alta specialmente in Luglio—Settembre. Cfr. Tav. XVI.

(12)—In una popolazione stabile, il numero dei sopravviventi ad un'età x, è uguale al numero dei morti in età superiore ad x, e quindi la probabilità di morte in età x,—x,, è uguale al rapporto dei morti in età x,—x,, (che potremo indicare con Mx,—x,,) ai morti in età superiore ad x, (che potremo indicare con Mx,—w). Nel caso di Roma, la popolazione non e certo stabile, e i numeri Mx,—x,, , Mx,—w, distinti secondo le stagioni di nascita, presentano, come fu detto, notevoli lacune. Si può però ammettere, in via di approssimazione, che tali lacune si avverino con intensità non sensibilmente diversa per i nati nelle diverse stagioni e che l'ipotesi di una popolazione stabile abbia sulle probabilità di morte conseguenze analoghe per i nati nelle varie stagioni. I rapporti di Mx,—x,, a Mx.—w, relativi ad una data classe di età e ai nati delle diverse stagioni, potranno quindi, in via di approssimazione, ritenersi proporzionali alle rispettive probabilità di morte. E il quoziente del rapporto di Mx,—x,, a Mx,—w, ottenuto per i nati in una data stagione, al rapporto rispettivo ottenuto per i nati di tutte le stagioni potrà ritenersi proporzionale al rapporto della probabilità di morte in età x,—x,, per i nati in detta stagione, alla probabilità di morte per i nati in tutte le stagioni.

(13)—Ecco come si distribuiscono per stagioni e per cause di morte i morti da 0 a 1 mese in Roma dal 1897 al 1911.

CAUSA DI MORTE.

Stagione di morte	Immaturità e principali cause di morte frequentemente connesse con l'immaturità †	Eclampsia	Malattie dei bronchi e polmonite cruposae catarrale acuta	Principali malattie del sistema digerente ‡	Altre cause di morte	Totale dei morti
Inverno	2283	308	224	269	125	3209
Primavera ..	1529	200	61	252	93	2135
Estate	1263	158	24	459	73	1977
Autunno ...	1368	121	36	264	77	1866
Complessivamente	6443	787	345	1442	368	9187

(†) Cioè: idrocefalo, ernie cerebrali, spina bifida, cianosi, labbro leporino complicato, altre mostruosità, sifilide, pemfigo, eczema, sclerema.

(‡) E cioè: malattie della bocca e della lingua, gastrite, itterizia, enterite e catarro intestinale.

Anche questi dati sono il risultato di uno spoglio fatto eseguire appositamente dal Comm. Pelissier sotto la direzione dell'Avv. Mancini.

(14)—P. MANTEGAZZA. *Igiene dell'amore.* Milano, Brigola, 1879. Pagg. 266-267.

15. Sta qui un danno indiretto dell'allattamento artificiale. Certamente più grave è il danno diretto che esso produce innalzando fortemente la mortalità infantile. Le ricerche in proposito risalgono al VILLERMÉ e si fecero in questi ultimi anni più accurate ed estese per opera del SILBERGLEIT, dello STERNEBERG, del METHORST, dell'HUBER.

A Berlino, in un lavoro compiuto nel 1905, il Silbergleit trovava tra i bambini allattati al seno una mortalità nel primo anno di vita del 5.7% che saliva al 23.4.% tra i nutriti con latte di vacca. A Nimega, lo Sterneberg trovò una mortalità del 5.3% tra i bambini allattati al seno e del 35.5% tra gli altri. All'Aja, la mortalità, per i nati del 1908, risultò del 3.44% tra i bambini allattati al seno per almeno 8 settimane e dell' 11.86% per quelli nutriti artificialmente. In Francia, tra i bambini dati a balia nel 1907, la mortalità nel primo anno di vita risultò del 33% tra quelli nutriti al seno e del 50% tra gli altri; ma probabilmente, come osserva l'Huber, la differenza è in realtà più forte di quanto da queste cifre non appaia, perchè alcuni bambini inscritti come nutriti al seno devono ricevere talvolta, almeno in via accessoria, un'altra alimentazione.

Resta però impossibile decidere quanta parte di queste differenze sia dovuta al diverso sistema di nutrimento di per sè e quanta invece a differenze concomitanti nella robustezza dei neonati, nella cura posta nel loro allevamento, nella frequenza con cui vengono dati a balia, e forse in altre circostanze. (*a*) E'forza spesso ricorrere all'allattamento artificiale quando la madre è afflitta da malattie trasmissibili o quando l'allattamento ne comprometterebbe la salute o quando la quantità del suo latte è scarsa o la qualità non è soddisfacente: sono tutte queste circostanze che sempre o spesso si accompagnano con una debolezza costituzionale della madre, la quale in un certo grado si trasmette all'organismo del neonato; perciò, se i bimbi allattati al seno fossero nutriti artificialmente, sarebbe da attendersi che essi mostrassero una mortalità minore di quella che risulta per i bambini nel fatto nutriti artificialmente. (*b*) Quando il nutrimento artificiale non è imposto da tali circostanze, esso viene adottato per ignoranza o per trascuratezza o per poco affetto dei genitori; ed è naturale che genitori ignoranti o trascurati o poco affezionati ai figli si prendano in ogni contingenza minor cura del loro allevamento e meno li preservino dai pericoli, che indipendentemente dal sistema di nutrimento, insidiano le loro fragili vite. (*c*) I bambini dati a balia vengono, almeno in Francia, nutriti artificialmente più spesso di quelli allevati dalla madre. Nel 1907, su 90,000 bambini dati a balia, in Francia, solo 25,000 venivano allattati al seno; questi fornivano 1850 morti nel I. anno di vita sopra un totale di 7,950; mentre a Parigi, nel quinquennio 1905-909, fra tutti i bambini morti al di sotto di un anno, 10,780 erano allattati al seno e 14,684 nutriti in modo diverso. D'altra parte, i bambini dati a balia sono evidentemente meno curati e quindi più

esposti alla morte, indipendentemente dal sistema di nutrimento, di quelli allevati in famiglia. Per questa sola circostanza, sarebbe da attendersi che la mortalità fosse più elevata per i bambini nutriti artificialmente.

Dell'influenza di una parte di queste circostanze è in qualche modo tenuto conto nei lavori del Methorst e dell'Huber. (W. Methorst. *Mortalité et morbidité des nourissons à la Haye nés en* 1908, *en rapport avec la manière de les nourrir et les circonstances sociales*. Bull. de l'Institut Int. de Statistique. XIII. Session, 1911, Rapport N.21; M. Huber. *Mortalité suivant le mode d'allaitement des enfants placés en nourrice en France*. Ibidem, Rapport N.17). Questi infatti confrontava la mortalità dei nutriti al seno e dei nutriti artificialmente tra i bambini dati a balia; quello distingueva i bambini, non solo secondo il sistema di nutrimento, ma anche secondo la maniera (buona, passabile, cattiva) di curarli. Tener conto però di tutte le circostanze perturbatrici e in modo completo, nè si è fatto finora, nè pare, per ora, possibile di fare.

16. L'Hrdlicka, nelle sue osservazioni fisiologiche e mediche sopra le tribù indiane del Sud-Ovest degli Stati Uniti e del Nord del Messico, fra le quali l'allattamento viene proseguito quanto più oltre è possibile (di regola fino ad un nuovo parto), ha stabilito, per 21 casi, l'intervallo fra il parto e il riapparire della mestruazione e, per altri 18 casi, l'intervallo, dopo il quale la mestruazione non era ancora riapparsa.

Su questi 39 casi, una sola volta la mestruazione riapparve 3 mesi dopo il parto, e si trattava di un caso eccezionale in cui il nato era stato allattato da persona diversa della madre. Cfr. Ales Hrdlicka. *Physiological and Medical Observations among the Indians of South-Western United States and Northern Mexico*. Smithsonian Institution. Bureau of American Ethnology. Bulletin 34, Washington Government printing office, 1908. Pagg. 64 e segg.

THE CONTRIBUTIONS OF DEMOGRAPHY TO EUGENICS.

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CHAPTER I.

Mortality during development in the human species and in that of the higher animals.

1. In the writings of biologists we often meet with the idea that the more evolved the species the less its mortality during development. Making use of a phrase unscientific, but to the point, we may say that the more Nature perfects the type of organism, the more she feels the need of economising lives. For instance, thousands of eggs are necessary to ensure the production of one adult frog, but offspring of the eagle and the lion are able to reach maturity in practically all cases.

If this rule turned out to be well founded, we should certainly have to say that the human species provided a notable exception, compared with some species of the higher animals.

For the human species we are furnished with tables of mortality for a comparatively recent period relating to nearly all the countries of Europe, and some of those of America, Asia, and Oceania. The percentage of offspring who die before complete development, which in man may be put down at twenty years of age, varies from 55% in India and 50% in Spain, to 22% in Norway, Sweden, Denmark and Ireland, and 21% in Western Australia (1).

For the equine species Caramanzana has worked out a table of mortality according to which not more than 9.4% of the offspring die before attaining four years of age, when the horse attains to complete development (2). In the human species this percentage is exceeded only in the first year (3). Caramanzana's table rests, indeed, upon a basis of hypotheses, which, however ingenious, are uncertain; but the reliable and extensive data published by the Scandinavian Society for the insurance of live-stock suggest that the co-efficients of mortality given by Caramanzana are very near the truth, and, if anything, rather too high (4). These data are based upon decennial census figures relating to Swedish horses, and refer to the ages from one to nineteen years. The co-efficient of mortality between 0 and one year of age is missing. If we suppose that from 0 to one year of age the mortality is represented by the calculations of Caramanzana, and that from one to four it is represented by the observations on Swedish horses, we shall be justified in saying that out of 10,000 horses born, 9,257 survive to maturity.

The data published by the Scandinavian Society for the insurance of live stock refer, no doubt, to a rather select equine population; for the insured horses are undoubtedly better cared for in general than those not insured; but in any case their mortality during development is still much less than that of human classes living under the best hygienic and economic conditions.

The following data (5), though not very recent, leads us to suppose that a survival of 93% to 94% at one year of age, and of 80% to 85% at 20 years of age constitutes in the human species a maximum not easy to improve upon

TABLE I.

Survival of offspring among the higher classes of the human species. Numbers of survival of every 1,000 *born at the age* X.

Age X.	Upper Classes (Ansell 1874)				English Peers (Bayley & Day) (1861)	Reigning Families of Europe 1841-90 (Sundbärg)
	Clergy	Legal Profession	Medical Profession	Other Families		
1	926	920	913	916	930	936
5	886	878	862	854	899	877
10	867	855	837	840	882	—
15	848	839	821	825	—	—
25	785	781	768	768	—	—

Moreover, the data for the general population which can be extracted from census figures, rough approximation though they are, confirm the fact that with increase of age the number of survivors in the equine species diminishes much less rapidly than in the human species (6).

2. The absence of statistics relating to other species of the higher animals, in a wild state, leaves room for two main hypotheses; either the mortality is during development analogous to that shewn by the human species, and the low mortality in the equine species is due to eugenic measures taken in the breeding and rearing of the domestic horse: or the mortality is during development analogous to, and perhaps less than, that shewn by the domestic horse, and the high mortality during development amongst the species of higher animals is a sad prerogative of the human race.

In the first hypothesis the utility of Eugenics would be demonstrated and the Eugenist could already think of using for the improvement of the human race those practices which are now in vogue amongst horse-breeders; in the second hypothesis it would remain to be decided before everything else

whether the high mortality in the human species during development constitutes a natural and specific characteristic of its own, or whether instead it is a consequence of the more or less artificial conditions in which, so far as the civilised races are concerned, the breeding and rearing of man is accomplished.

Now, although the absence of statistical data prevents us from choosing with certainty between these two hypotheses, we may at least consider the second as being more likely than the first; for the experience of horse-breeders teaches us that mortality during development is greater in the most rigorously selected equine races than in the commoner ones which are more nearly in the wild state; and analogous differences are found according to common observation in dogs, cats, and other domestic species.

It becomes, therefore, of great interest to study the influence on the characteristics of individuals of circumstances by which the breeding and rearing of the offspring of civilised human races differ from the breeding and rearing of the offspring of the higher animals in a wild state.

These circumstances may be reduced essentially to three:

(*a*) The human species reproduces itself at all periods of the year, while the species of the higher animals reproduce themselves during one or few specific periods of the year.

(*b*) Animal species in a wild state reproduce themselves as soon as the organism is capable of reproduction, while in civilized human races there is a period, more or less long, between the moment when the organism is capable of reproduction and the moment when it actually does reproduce itself.

(*c*) In civilized human races, the high development of altruistic sentiment protects the weak and diseased from the weeding-out process of natural selection, and often enables them to take part in the production of future generations.

3. The study of the influence of these three factors becomes of much greater importance when it is seen that the work of Eugenists will have to be specially directed towards their control.

In fact we can think of several means of improving the human race, especially:

(1) Selecting the reproducers;

(2) Placing the reproducers in the most favorable environment;

(3) Regulating in the best way the circumstances in which the unions are consummated, both as regards the absolute and relative ages of the reproducers, and as regards the season in which the unions take place, and the interval between successive conceptions.

(4) Placing the offspring in the most favorable environment.

Improvement of the environment in which the reproducers live and their offspring develop undoubtedly has beneficial effects upon the human race; to realise its importance it is only necessary to reflect that the higher classes

differ from the rest of the population chiefly in respect of the quality of their environment; we must also bear in mind the enormous differences which have been discovered between the two classes so far as mortality during development is concerned.

But the self-interest of individuals and family affection seem sufficient to make certain of this improvement so far as it is possible, while as far as means 1 and 3 for improving the race are concerned, sexual instinct, social habits and individual ambition are in a position to cause results diametrically opposed to those desired by Eugenists. On means 1 and 3 therefore the attention of Eugenists ought to be concentrated. Now such means especially consist in the control of the circumstances by which the breeding and rearing of human offspring differ from the breeding and rearing of the species of higher animals in a wild state.

4. This paper is specially devoted to bringing new contributions to bear on the study of these circumstances, based upon data obtained mainly from the most accurate official statistics on the fluctuations of the population, and partly from investigations specially made, or caused to be made, by the author in the offices of Municipal Statistics at Rome and Cagliari, and the lying-in Hospitals of several Italian towns.

CHAPTER II.

Offspring in relation to the month of conception.

5. The phenomenon of the periodicity of births according to months has been investigated for some time, using data relating to many States in Europe. In these States the number of births gives two maxima: one, covering the longer period, extends in most of these countries between January and April, corresponding to conceptions occurring between April and July; the other, shorter and as a rule less marked, is reached in September, and corresponds to conceptions occurring in December. This is usually attributed to social causes, especially to the return of many absentees at the feasts of Christmas and the New Year, and to the consequent resumption of interrupted conjugal intercourse; the other is attributed exclusively or chiefly to natural causes; that is to say, to a greater capacity of the human organism for reproduction in the spring. The fact that illegitimate births shew a longer and higher maximum during the winter months, and that they usually shew the maximum of September either slightly or not at all, is regarded as a confirmation of this explanation.

If this be admitted, it is reasonable to compare the greater fecundity of the human species during spring with the period of heat which, in the greater part of those animal species which have a single period, falls in the same season. The much greater frequency of conception in spring represents in fact,

TABLE II.

Number of births in relation to months in Europe.
Daily mean of births in each month, having made the average daily mean for the whole year = 1,000.

Month of birth	Ireland (2) 1891-900	England and Wales (2) 1838-903	Norway (3) 1896-1900	Sweden (3) 1898-902	Finland (3) 1878-80	Denmark (3) 1895-900	Holland (2) 1900-904	Germany (3) 1903	Western Austria (3) 1871-80	Switzerland (3) 1871-90	Belgium (3) 1841-900	Luxembourg (3) 1901-903	France (3) 1872-80	Italy (3) 1907-909	Spain (2) 1878-901	Roumania (2) 1880-94	Bulgaria (3) 1902	Servia (3) 1901	Croatia and Slavonia (2) 1900-902	Galicia and Bukowina (3) 1871-80	Hungary (2) 1900-902	Probable months of conception
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
January	1048	1034	1013	1026	1078	977	1030	1007	1043	1010(4)	1049	1011	1006	1107(5)	1095	884	1194	1135	955	1175	992	April
February			1045	1025	1047	1044	1096	1045	1075	1030	1110	1133	1077	1225	1198	1105	1199	1305	1057	1153	1094	May
March			1026	1080	1063	1065	1064	1030	1051	1040	1107	1109	1080	1072	1151	1021	971	1189	1064	1065	1092	June
April	1061	1028	1025	1042	1008	1042	1026	1023	1026	1020	1055	1036	1059	1026	1049	1069	933	1035	1109	1007	1041	July
May			1020	979	1028	1011	990	1025	1005	1000	1002	1057	1006	959	979	1083	798	1005	1025	945	980	August
June			1002	976	1041	992	951	968	970	1000	965	957	966	913	907	1016	827	977	994	913	951	September
July			995	959	1049	973	950	978	975	1010	935	922	963	936	881	1076	927	989	924	921	951	October
August	970	974	987	929	947	1011	987	994	959	1000	945	946	969	959	910	973	1032	1010	1048	942	1005	November
September			1102	1097	1023	1047	1018	1023	989	1010	970	934	985	1024	974	957	1178	1008	1114	926	1057	December
October			977	969	877	974	958	950	984	970	947	946	958	994	961	1211	1315	1046	1018	987	1007	January
November	923	965	888	941	885	939	956	976	983	970	951	1026	971	984	945	961	979	707	902	984	952	February
December			926	981	956	927	980	984	945	960	969	936	965	905(6)	960	651	661	609	795	991	884	March

(1) These data are the result of the investigations of the author, except as regards France, Western Austria, Switzerland, Finland, Galicia and Bukowina, where they are taken from MAYR (*Statistik und Gesellschaftslehre* Freiberg I B. Mohr, 1897. II. Band. Pag. 172) and for Luxembourg and Germany where they are taken from *Mouvement de la population dans le Grand Duché de Luxembourg pendant l'anné, 1903* (Luxembourg Worré-Martens, 1905) Page 132-133. The original data were taken from official statistics, except in the case of Bulgaria and Spain, the data for which I received in MSS. from the general department for statistics in those two countries.

(2) Still-born excluded.

(3) Still-born included.

(4) The last figure is approximate.

(5) The daily mean of births for Italy is lowered in December and raised in January by the delay which in many districts ensues between the actual births and their notification during the last days of the year (see R. BENINI. *Le denunzie di nascite in alcuni compartimenti italiani.* Proceedings of the Regia Accademia dei Lincei Vol. XIX. Section 12. Rome. Press of the R. Acc. dei Lincei 1911, also for other States, F. CORRIDORE, *Denunzie retardate di nascite.*

TABLE III.

Number of births in relation to months (1).

Daily mean of births in each month, having made the average daily mean for the whole year = 1,000.

Month of birth in the Northern Hemisphere	North America				South America	Oceania			Asia				Africa	Month of birth in the Southern Hemisphere
	West Greenland (2) 1851-90	District of Columbia (3) 1908-909	Town of Providence (4) 1856-904	Mexico (3) 1895-901	Town of Buenos Ayres (3) 1906-907	New South Wales (3) 1896-905	Victoria (3) 1900-905	Western Australia (3) 1898-904	Japan (3) 1899-903	Bengal (3) 1900-905	Madras (3) 1903-905	Bombay (3) 1903-905	Isle of Mauritius (3) 1903-905	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
January	1130(5)	1033		942	1075	1016		1065	1284	984				July
February... ...	1100	1109	985	956	1031	1046	1170	1044	1218	1027	859	926	974	August
March	1080	1096		1011	1016	1032		1057	1213	1036				September
April	990	856		997	1032	1009		1009	1034	1001				October
May	1020	878	977	980	981	986	919	998	865	942	994	858	1086	November
June	960	1021		1024	921	941		901	748	877				December
July	1010	1013		1078	948	987		943	822	873				January
August	920	1016	1021	1010	938	986	938	958	843	969	1093	1001	1004	February
September ...	970	1028		1005	948	1000		969	975	1065				March
October	910	963		1089	1002	978		1016	961	1077				April
November ...	940	989	1018	963	1063	1003	970	1011	1033	1081	1055	1215	935	May
December ...	970	999		943	1040	1004		1026	1018	1073				June

(1) These data are the result of the investigations of the author, except Greenland, in which case they were taken from *Sammandrag of statistiske Oplysninger om Grønland*, Kiobenhavn, Bianco Lunos, 1912. The original data are taken from official statistics, except in the case of Bengal, when they were sent in MSS. to the author by the Director-General of Commercial Intelligence. 31/5/06.

(2) Native population.

(3) Stillborn excluded.

(4) Stillborn included up to 1896, excluded in later years.

(5) The last figure is approximate.

according to the views of several authors (Westermarck, Haycraft, Ewart), an atavistic survival of an original season of reproduction.

Having reached this point it is natural to ask ourselves whether individuals conceived in spring, and thus following, one might say, the primordial custom of our species, might not be found to shew particularly favourable characteristics Starting from this point, Ewart appears to have ascertained that children born in the months January to March, and after them children born in the months April to June, seem to be, at the age of eleven, as regards stature and weight, in a particularly favourable condition. In the seventh and twelfth year the number of the survivors of those born in the first half of the year is clearly in excess of those born in the second half of the year (7).

6. A close examination of materials relating to births according to months (Tables II. and III.) cuts at the very basis of this argument.

In Europe itself (see Table II.) we find countries (Denmark, Roumania, Croatia and Slavonia, Hungary) in which the births during January, corresponding to conceptions in the middle of spring, are found to be below the mean; in others, the conceptions during spring (births between January and March) are nearly equalled (England and Wales, Norway) or surpassed (Ireland) by those in the summer (births between April and June).

But the gravest doubts arise when we examine the phenomena in countries outside Europe. The data in Table III, the first of the kind, I think, to be published, although not numerous enough to shew for the other parts of the world a regularity like that found for Europe, are in any case more than adequate to show that the regularity found for Europe does not hold good for other countries. In North America we often see (districts of Columbia, City of Providence, Mexico), a well defined maximum of births during the summer and also in autumn, corresponding to conception during autumn and winter, while the maximum of conception in the spring sometimes fails to appear (Providence), and sometimes is just apparent (Mexico). In Greenland, besides the highly pronounced maximum between January and March, we observe others in May and July. In South America as in Australia, Japan, and Bengal there is a maximum of births in the winter, but the maximum begins to shew itself (except in Victoria), in September, October, and November; and in Bengal it is higher in these months than in the winter months. Finally in Madras, Bombay, and Mauritius, the quarterly data do not shew any maximum of conceptions in the spring, while the births corresponding to the autumn and winter conceptions (for Bombay and Madras) and to the summer and autumn (Mauritius) rise above the mean.

These results for many non-European countries, while they differ notably among themselves, are at one in shewing a tendency, considering births according to months, rather different from that observed for some time past

TABLE IV.

*Numbers of Births according to months.**

Month of birth in Northern Hemisphere	Daily mean of births in each month having made the average daily mean for the whole year = 1000						Month of birth in Southern Hemisphere
	District of Columbia 1908-909		Island of Mauritius 1903-905		Japan 1899-903		
	White Population	Coloured Population	European Population	Indian Population	The whole State	Isle of Yeso	
1	2	3	4	5	6	7	8
January ...	*1034*	*1029*			*1284*	*1179*	July
February ...	*1046*	*1260*	997	965	*1218*	*1141*	August
March ...	*1110*	*1066*			*1213*	*1171*	September
April ...	884	794			*1034*	*1091*	October
May ...	900	831	*1049*	*1100*	865	959	November
June ...	*1016*	*1029*			748	911	December
July ...	*1001*	*1039*			822	845	January
August ...	*1012*	*1023*	975	*1015*	843	856	February
September	*1023*	1037			975	987	March
October ...	990	903			961	951	April
November	983	*1002*	977	919	*1033*	*1010*	May
December	996	*1005*			*1018*	912	June

*Data worked out by the author from original figures of official statistics.

in Europe. We can therefore say that the idea of a natural maximum of conceptions during spring, as opposed to a natural depression during other seasons, cannot be upheld in view of the more extensive materials which the study of statistics can give us to-day.

7. We may say that difference of race has no decisive influence in some countries at any rate. The whites and blacks of the districts of Columbia; the descendants of the French and the Indian emigrants in the Isle of Mauritius; the Japanese and the inhabitants of the island of Yeso, who are more or less pure descendants of the primitive Ainus—none of them exhibit any essential difference in the monthly periodicity of births. (See Table IV.). The Indians of Mauritius, so far as can be judged from quarterly data, more especially resemble, if we consider this characteristic, the European descendants of the same island than the populations of their Mother Country. (See Table III. data for Madras, Bombay and Bengal).

That climate should have some sort of influence seems very probable. In fact, in the most northern countries of Europe the maximum of births, instead of stopping in April or May, often goes on till June and July (Ireland, England, Wales, Norway and Finland) and a similar phenomenon appears in mountainous Switzerland (see Table II). In the hotter countries, as Madras, Bombay, Bengal, and in Mexico, the maximum of conceptions coincides substantially with the coldest season. If in the cold countries we consider the most northerly regions, we find sometimes, for instance in the districts of Tromsöe and

Finmarken in comparison with the whole of Norway (see Table V. Col. 4-7), that the maxima of conceptions move towards the hottest months; and if in the hot countries we consider the most southerly parts (for example the States of Yucatan, Canipeche, Chiapas and Tobasco in Mexico, see Table V. Col. 10-11) we find that the maxima move instead towards the coldest months. Other comparisons however give negative results. In Sweden, for instance, the maximum of conceptions during the spring does not go on in summer, nor do we find a continuous maximum in summer in very cold Greenland (8) (see Table II). Northern Greenland compared with Southern Greenland, the Northern part of Sweden compared with the whole country, and the Faroe Islands compared with the whole of Denmark, shew, indeed, in the monthly periodicity of births notable differences, but these cannot be ascribed to the direct influence of climate (see Table V).

TABLE V.

Births according to months (1).

Daily mean of births in each month, after making the average daily mean for the whole year = 1,000.

Month of Birth	West Greenland 1851-900		Norway legitimate Births 1896-900		Norway illegitimate Births 1896-900		Sweden		Mexico		Denmark		Probable month of conception
	North Greenland	South Greenland	Tromsöe & Finmarken	The whole State	Tromsoe & Finmarken	The whole State	North 1901-905	The whole State 1898-902	Yucatan, Campeche, Chiapas & Tobasco 1895-1900	The whole Confederation 1895-901	The Faroe Islands 1896-900	The whole of Denmark 1895-900	
1	2	3	4	5	6	7	8	9	10	11	12	13	14
January ...	*1190*(2)	*1100*(2)	824	*1013*	855	*1007*	*1076*	*1026*	926	942			April
February ...	*1200*	*1070*	861	*1044*	777	966	*1029*	*1025*	908	956	836	*1029*	May
March ...	*1140*	*1040*	*1027*	*1026*	*1011*	966	964	*1080*	899	*1011*			June
April ...	880	*1030*	*1181*	*1025*	*1101*	*1003*	974	*1042*	943	997			July
May... ...	830	*1100*	*1318*	*1020*	*1360*	*1095*	983	979	909	980	864	*1015*	August
June... ...	*1000*	960	*1231*	*1002*	*1420*	*1103*	964	976	*1015*	*1024*			September
July	*1030*	*1000*	*1147*	995	*1026*	980	*1004*	959	*1176*	*1078*			October
August ...	930	900	*1186*	987	*1086*	935	*1028*	929	*1021*	*1010*	*1268*	*1011*	November
September ...	950	990	*1122*	*1102*	*1086*	*1118*	*1112*	*1097*	*1035*	*1005*			December
October ...	960	890	866	977	937	943	913	969	*1115*	1089			January
November ...	900	950	654	888	647	894	907	941	*1051*	963	*1026*	947	February
December ...	990	970	579	926	684	993	1049	981	993	943			March

(1) Data collected by the author from the original official statistics, Greenland excepted, the data for which were taken from *Sammendrag af statistiske oplysninger om Groenland*.—Page 12.

(2) Last figure approximate.

Granting that climate does have some influence, we may imagine that in these countries it may be counteracted or even overcome by the effect of other circumstances. It is probable that among populations depending upon fisheries, as in the Faroe Islands and Greenland, the physical labour, and the more or less lengthy absences of the males from their families, may have a decisive

influence. In general, it seems reasonable to admit that the diversity of occupation, journeys, feasts, periods of fasting and mourning, and the other civil and religious customs may have a notable influence on the greater or lesser frequency of conceptions. The influence of religious customs appears clearly if we compare the birth-rates in the Protestant districts of Germany with those of the Catholic and mixed. (See Table VI.)

TABLE VI.

Births according to months (1).

Daily mean of births in each month, after making the daily mean for the whole year = 1,000.

Month of Birth.	Roumania 1880-94		Germany, 1872-80 Legitimate Births			Germany, 1872-80 Illegitimate Births			Probable month of Conception
	Born in Towns	Born in Country Districts	Protestant Districts	Catholic Districts	Mixed	Protestant Districts	Catholic Districts	Mixed	
1	2	3	4	5	6	7	8	9	10
January	*1074*	847	*1017*	*1004*	*1025*	*1091*	*1077*	*1097*	April
February... ...	*1193*	*1092*	*1036*	*1043*	*1057*	*1136*	*1178*	*1158*	May
March	*1073*	*1012*	*1016*	*1043*	*1046*	*1077*	*1126*	*1115*	June
April	990	*1083*	982	*1024*	*1002*	*1025*	*1052*	*1064*	July
May	929	*1112*	958	990	970	988	*1019*	*1020*	August
June	932	*1032*	947	978	937	950	975	963	September
July	960	*1098*	965	982	951	903	942	927	October
August	968	974	*1003*	980	988	878	860	870	November
September ...	938	961	*1077*	*1017*	*1048*	*1018*	953	963	December
October	*1058*	*1240*	*1012*	993	*1001*	918	946	887	January
November ..	*1006*	955	998	988	997	965	928	937	February
December ...	893	605	993	955	983	*1061*	958	*1010*	March

(1) The data for Roumania were worked out by the author from the original official statistics; those for Germany are taken from *Mayr, Statistik und Gesellschaftslehre.* Page 172.

We may, perhaps, ascribe the differences between town and country which in Roumania for example are considerable (see Table VI.) to the influence of the different professions. But it is probable that here, as certainly in other cases, the influence of the frequency of marriages according to months comes into play.

I do not know upon what data the assertion is founded which is at present taken for granted by statisticians, that the monthly oscillations in the frequency of marriages have no sensible influence on the monthly oscillation in the frequency of births. The explanation of this fact should be found in the variation in the interval between marriage and first birth.

However, it is clear that this variation may shew well marked differences from country to country according to the greater or less diffusion of Neo-Malthusian practices, the relative ages of those marrying, and especially, the greater or less frequency of conception before marriage. Owing to this, it may

TABLE VII.

Marriages and births according to months in Luxemburg, 1901-1903.*

Daily mean of births for each month, after making the daily mean of births for the whole year = 1,000.

Month of Birth	Legitimate Births			Illegitimate Births	Illegitimate and legitimate births, excluding legitimate first-born	Month of Marriage
	Marriage	First-born	Following Births			
1	2	3	4	5	6	7
January	*1314*	*1024*	998	*1059*	*1000*	April
February	*1202*	*1197*	*1108*	*1290*	*1117*	May
March	820	*1173*	*1091*	*1245*	*1099*	June
April	699	909	*1068*	*1191*	*1073*	July
May	716	985	*1075*	*1232*	*1083*	August
June	935	893	974	903	971	September
July	870	864	943	781	935	October
August	*1258*	996	934	781	927	November
September ...	772	915	936	931	936	December
October	*1412*	895	967	768	958	January
November	*1715*	*1210*	983	903	979	February
December	367	955	932	940	932	March

* Data taken from *Mouvement de la population dans les Grand Duché pendant l'année*, 1903.
See pages 123, 124, 125, 132.

well be that this assertion is well founded for one State and incorrect for another. The decisive proof of its truth or falsity for a given country, may be established by comparing the frequency of marriages in each month with the frequency of conceptions, considering the legitimate first-born and the other births separately. We may make this comparison in the case of Luxemburg (see Table VII). The monthly frequency of first-born (see Col. 3) differs markedly from that of the other legitimate births (see Col. 4) and the total births (see Col. 6). Now these differences appeared to be due to the influence of marriages of nine or ten months before. In fact, when the marriages of nine or ten months before shew a frequency greater than the yearly mean, the frequency of first-born is relatively higher than that of other births ; the contrary happens in the opposite case.

Between the frequency of first born in a certain month and that of marriages nine or ten months before we find an undoubted parallelism which would probably be even more marked if we were in a position to consider fortnightly rather than monthly periods.

Legitimate and Illegitimate births according to months (1). Daily mean of births in each month after making the daily mean for the whole year = 1000.

Month of Birth.	Norway (2) 1896-900		Sweden (2) 1898-902		Denmark (3) 1895-900		Germany (3) 1903		Switzerland 1876-901		Luxemburg (3) 1901-903		Bologna (2) 1877-900		Hungary (2) Kingdom of 1900-902		Mexico (3) 1895-901		Probable month of conception.
	legitt.	illegitt.	legitt.	illegitt.	legitt.	illegitt.	legitt.	illegitt.	legitt.	illegitt.	legitt.	illegitt.	legitt.	illegitt.	legitt.	illegitt.	legitt.	illegitt.	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
January ...	*1013*	*1007*	*1022*	*1038*	974	*1002*	*1006*	*1022*	*1010*(4)	*1100*(4)	*1009*	*1059*	*1041*	986	979	*1062*	964	924	April
February ...	*1044*	966	*1025*	*1014*	*1043*	*1056*	*1037*	*1135*	*1020*	*1130*	*1126*	*1290*	*1081*	*1044*	*1084*	*1139*	981	929	May
March	*1026*	966	*1075*	*1110*	*1066*	*1058*	*1025*	*1082*	*1030*	*1080*	*1103*	*1245*	*1032*	*1090*	*1087*	*1106*	*1004*	996	June
April	*1025*	*1003*	*1038*	*1068*	*1040*	*1066*	*1017*	*1080*	*1020*	*1060*	*1030*	*1191*	998	*1029*	*1050*	*1049*	*1013*	962	July
May	*1020*	*1095*	971	*1055*	*1008*	*1037*	*1020*	*1076*	1000	*1050*	*1050*	*1232*	950	946	986	988	995	950	August
June	*1002*	*1103*	965	*1082*	991	*1007*	967	982	1000	970	959	903	922	949	957	947	*1046*	*1017*	September
July	995	980	960	963	978	926	983	923	*1010*	920	927	781	974	941	953	892	*1082*	*1074*	October
August ...	987	935	943	814	*1023*	906	*1006*	860	*1010*	880	952	781	*1005*	980	*1016*	957	*1005*	*1022*	November
September ...	*1102*	*1118*	*1103*	*1072*	*1052*	*1002*	*1026*	*1001*	*1010*	950	934	931	*1064*	*1030*	*1068*	*1034*	983	*1005*	December
October ...	977	943	975	923	976	951	957	878	970	890	953	768	*1008*	*1032*	*1012*	970	*1011*	*1145*	January
November ...	888	894	946	884	934	985	978	960	960	980	*1031*	903	966	978	947	930	944	979	February
December ...	926	993	981	984	919	*1003*	982	*1016*	960	990	936	940	971	*1005*	866	932	928	976	March

(1) Data worked out by Author from original official statistics, except in the case of Germany and Luxemburg, for which the data were taken from *Mouvement de la population dans le Grand Duché du Luxembourg.*—Pages 132-133, and of Switzerland, for which the data were taken from PRINZING, *Handbuch der Medizinischen Statistik*, Jena, Fischer, 1906, Page 63.

(2) Stillborn excluded. (3) Stillborn included. (4) Last figure approximate.

Traces of an influence caused by the monthly variation in the number of marriages on the monthly variation in the number of births can also be found in another way. If that maximum of births which occurs in autumn should be found to depend solely upon the resumption of conjugal intercourse owing to the feasts of Christmas and New Year, it should be confined to September, or at the farthest to the first days of October. If we consider illegitimate births in those countries where we observe an autumnal maximum (Norway, Sweden, Denmark, Germany, Bologna and Hungary) (see Table VIII,) it falls in these two months; if instead we consider the legitimate births (see Table VIII,) or the total births (see Table VII,) it not rarely shows itself and often markedly even in August (Denmark, Germany, Switzerland, Bologna, Hungary, Bulgaria, Servia, Croatia, Slavonia). We certainly have little reason to suppose that the number of eight month gestations should be so great that those conceived at the end of December should increase sensibly the number of those born in August. It rather points to the influence of marriages which are contracted in great numbers during November.

We may say in conclusion that the variations which we find in the different months caused by climate, professions, civil and religious customs of the people, migration, the number of marriages, have no doubt a distinctly marked influence on the monthly variation of births. This influence is of such a nature that it is quite impossible to decide whether independently of these circumstances a natural maximum of conceptions should exist in one rather than in another season of the year owing to a greater capacity of the human organism for reproduction.

TABLE IX.

Frequency of multiple births according to seasons.

Month of Birth,	Those Born of Multiple Deliveries.				Multiple Deliveries per 100 bths	Multiple Deliveries per 100 dlvs	Twins per 100 births
	Amsterdam 1850-904	Bologna 1877-900	Florence 1906-909	Servia 1901	Luxemburg 1901-903	Spain 1901	Berlin 1899-904
1	2	3	4	5	6	7	8
December to February	2·28	2·24	2·37	*3·33*	*1·58*	0·88	1·090
March to May ...	2·28	2·53	2·28	2·97	1·27	0·86	*1·091*
June to August ...	2·20	*2·72*	*2·77*	2·58	1·18	*0·97*	1·005
September to Nov. ...	*2·43*	2·35	2·23	1·71	1·16	0·79	1·080

* Data worked out by author from official statistics.

8. On the other hand, the examination of the frequency of multiple births and of the vitality of the offspring according to the season of conception does not suggest in any way for the human species the existence of an atavistic survival of an original season of reproduction.

Even in multiple births (at least if we consider those caused by more than one egg) many persons have tried to find an atavistic survival. We should therefore expect to find, according to this idea, that their frequency is greatest in the conceptions during that period of the year which was the original season for the reproduction of our species, that is to say, in the conceptions of the spring, and therefore in the births of the winter.

The data, which I have been able to work out (see Table IX.) on the frequency of multiple births according to seasons, do not shew any such regularity; in two countries (Servia, Luxemburg) the maximum frequency is found amongst the births of December to February; in three (Bologna, Florence and Spain) among those of June to August; in one (Berlin) among those of March to May; in one (Amsterdam) among those of September to November.

TABLE X.

*Season of Conception.**

Budapest 1903-1905.

State of offspring	Probable season of conception				Total
	Spring	Summer	Autumn	Winter	
1	2	3	4	5	6
Legitimate Births.					
Miscarriages	1411	1418	1480	1418	5727
Stillborn	348	377	322	304	1351
Born alive	11703	12713	11708	11481	47605
% Miscarriages on those born alive	*12·1*	*11·2*	*12·6*	*12·4*	*12·0*
% Stillborn on those born alive ...	*3·0*	*3·0*	*2·7*	*2·6*	*2·8*
% Miscarriages and Stillborn on those born alive	*15·1*	*14·2*	*15·3*	*15·0*	*14·8*
Illegitimate Births.					
Miscarriages	477	544	448	506	1975
Stillborn	201	190	155	178	724
Born alive	4636	4569	4138	4358	17701
% Miscarriages on those born alive	*10·3*	*11·9*	*10·8*	*11·6*	*11·2*
% Stillborn on those born alive ...	*4·3*	*4·2*	*3·7*	*4·1*	*4·1*
% Miscarriages and Stillborn on those born alive	*14·6*	*16·1*	*14·5*	*15·7*	*15·3*
Legitimate and Illegitimate Births.					
Miscarriages	1888	1962	1928	1924	7702
Stillborn	549	567	477	482	2075
Born alive	16339	17282	15846	15839	65306
% Miscarriages on those born alive	*11·56*	*11·35*	*12·17*	*12·15*	*11·79*
% Stillborn on those born alive ...	*3·36*	*3·28*	*3·01*	*3·04*	*3·18*
% Miscarriages and Stillborn on those born alive	*14·92*	*14·63*	*15·18*	*15·19*	*14·97*

* Data worked out by author from official statistics.

9. Nor does the season of conception seem to have any influence on the vitality of the embryo. For some countries the vitality of the embryos can be followed even from the early stages of their development after conception. In fact the yearly returns from Vienna and Budapest shew the month of delivery and the duration in months of gestation for miscarriages, so that it is possible to work back to a rough approximation of the month of conception. I say a rough approximation, because, on the one hand, the determination of the period of gestation in abortions cannot be made with certainty, and on the other, even when we know the month of delivery and the number of the month of gestation, it is impossible to work back to a determination of the month of conception with any precision (9). In order that the calculation may not be too uncertain, we must group the figures according to seasons. Tables X and XI shew the results obtained. These, indeed, do not show any great regularity. Considering the legitimate births of Budapest, the minimum frequency of miscarriages is found amongst those conceived in summer, and considering

TABLE XI.

Abortions and Still-born according to probable season of conception, Vienna, 1902-3.

State of offspring	Probable season of conception				Total
	Spring	Summer	Autumn	Winter	
1	2	3	4	5	6
Miscarriages	1187	1312	1259	1272	5030
Stillborn †	441	504	480	412	1837
Born alive	25·363	27·257	25·653	25·162	103·435
% Miscarriages on those born alive	*4·68*	*4·81*	*4·91*	*5·06*	*4·86*
% Stillborn on those born alive ...	*1·74*	*1·85*	*1·87*	*1·64*	*1·78*
% Miscarriages and Stillborn on those born alive	*6·42*	*6·66*	*6·78*	*6·70*	*6·64*

* Data worked out by Author, from Official Statistics.

† Embryos of a period of gestations of 8 months or more.

the illegitimate births of Budapest, and all the births of Vienna, it is found amongst those conceived in spring; the maximum frequency for Vienna is found in winter; in Budapest for the legitimate it is in autumn, and for the illegitimate in summer.

Tables X. and XI. give also data on the frequency of the still-born according to seasons; Table XII. gives similar data for a greater number of

TABLE XII. *Stillborn per* 100 *births according to Season* (1)

Month of Birth in Northern Hemisphere.	Norway. Kingdom(2) 1866-85 Legitim'e births	Norway. Kingdom(2) 1866-85 Illegiti'te births	Norway. Tromsoe & Finmarken (3) 1896-900 Legitim'e births	Norway. Tromsoe & Finmarken (3) 1896-900 Illegiti'te births	Sweden. Kingdom(3) 1898-902 Legitim'e births	Sweden. Kingdom(3) 1898-902 Illegiti'te births	Sweden. Noorbotten (3) 1901-905	Denmark(3) 1896-900 Denmark properly called	Denmark(3) 1896-900 Faroe Islands	Amsterdam (1) 1850-904	Prussia (2) 1872-81 Legitim'e births	Prussia (2) 1872-81 Illegiti'te births	Saxony (2) 1891-900	Austria (2) 1898-900	Hungary Kingdomof (3) 1900-902 Legiti'me births	Hungary Kingdomof (3) 1900-902 Illegiti'te births	Budapest (2) 1882-90	Luxemburg (2) 1901-903	Italy (3) Kingdom 1907-909	Italy (3) Piedmont 1900-909	Italy (3) Sicily 1900-909	Spain (3) 1878-901	Mexico (4) The whole confederation 1895-901 (3)	Mexico (4) States of Yucatan, Campeche, Chiapas & Tobasco 1895-900 (3)	Bengal 1900-905 (3)	Mauritius (3) 1903-905 White population	Mauritius (3) 1903-905 Indian population	Month of Birth in Southern Hemisphere.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
Dec. to February	3·41	5·50	3·27	5·63	2·58	3·64	2·67	2·69	3·46	5·42	4·2	5·7	3·7	2·9	2·24	3·12	5·5	3·05	4·97	4·67	4·39	1·78	2·00	2·10	2·56	7·58	11·22	July to September
March to May	3·40	5·43	2·32	4·76	2·54	3·52	2·66	2·55	2·13	5·33	4·0	5·5	3·6	2·8	2·03	3·03	4·9	3·29	4·49	4·25	4·38	1·69	1·97	2·09	2·21	5·86	7·50	October to December
June to August	3·19	4·75	2·57	4·26	2·35	3·40	2·26	2·44	3·12	5·26	3·8	5·2	3·3	2·7	1·94	2·78	4·7	2·68	4·28	3·91	4·66	1·76	1·99	2·10	2·53	6·52	7·44	January to March
Sept. to November	3·10	4·87	3·22	4·56	2·38	3·64	2·59	2·29	3·96	5·45	3·8	5·3	3·2	2·8	1·99	2·77	4·9	3·08	4·30	3·96	4·68	1·75	1·96	2·11	2·82	7·51	9·90	April to June

(1) Data worked out by the Author, except in the case of Norway, for which they were taken from *Folkemoengdens Bevaegelse*, 1866-1885, Kristiania. Aschehoug & Co., 1890, Page 184. The percentages for the four seasons given for Prussia, Saxony, Austria and Budapest are the mean of the monthly percentages given by PRINZING, *Handbuch der medizinischen Statistik*.—Page 57 and shown in Table XIII. The data for the other percentages were taken by the Author from the Official Statistics, except those for the Stillborn according to months in Amsterdam, which were sent in MS. to the Author by the Amsterdam Office of Statistics.

(2) % of Stillborn on total born alive and dead.

(3) % of Stillborn on total born alive.

(4) Stillborn at termine.

Still-born per 100 *births according to Months* (1)

Month of birth.	Norway (2) 1866-85		Sweden (3) 1898-902		Denmark (3) 1896-900	Amsterdam (2) 1850-904	Prussia (2) 1872-81		Saxony (2) 1891-900	Austria (3) 1898-900	Hungary (3) Kingdom of 1900-902		Budapest (2) 1882-90	Italy (5)			Spain (3) 1878-901	Mexico (4)		Bengal (3) 1900-905	
	Legitimate births	Illegitimate births	Legitimate births	Illegitimate births			Legitimate births	Illegitimate births			Legitimate births	Illegitimate births		Kingdom 1907-909	Piedmont 1900-909	Sicily 1900-909		The whole Confederation (3) 1895-901	States of Yucatan, Campeche, Chiapese and Tabasco (3) 1896-901		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	
January	3·46	5·74	2·73	3·71	2·90	5·55	4·3	5·8	3·7	2·9	2·26	3·14	5·4	4·82(5)	4·69	3·90(5)	1·77	1·89	1·90	2·47	
February	3·47	5·68	2·51	3·93	2·54	5·28	4·2	5·5	3·7	2·8	2·18	3·08	5·2	4·84	4·68	4·07	1·65	2·03	2·11	2·30	
March	3·47	5·71	2·61	3·43	2·63	5·30	4·2	5·6	3·8	2·9	2·08	2·97	4·9	4·66	4·54	4·23	1·67	1·93	2·13	2·19	
April	3·40	5·55	2·58	3·57	2·45	5·32	4·0	5·5	3·6	2·8	2·00	3·20	4·7	4·43	4·16	4·30	1·70	2·02	2·08	2·22	
May	3·34	5·07	2·41	3·58	2·57	5·37	3·9	5·4	3·4	2·8	2·01	2·92	5·2	4·36	4·04	4·64	1·68	1·97	2·06	2·24	
June	3·24	4·36	2·47	3·22	2·42	5·39	3·9	5·2	3·4	2·8	1·95	2·79	5·2	4·42	4·19	4·61	1·73	1·95	2·20	2·37	
July	3·13	4·95	2·32	3·40	2·51	5·17	3·7	5·3	3·2	2·6	2·01	2·81	4·5	4·28	3·81	4·66	1·71	2·00	1·97	2·52	
August	3·20	5·01	2·26	3·62	2·38	5·23	3·7	5·2	3·2	2·7	1·87	2·76	4·4	4·14	3·76	4·72	1·75	2·03	2·14	2·67	
September	2·94	4·28	2·21	3·53	2·23	5·17	3·5	4·9	3·0	2·7	1·83	2·53	4·8	3·96	3·67	4·63	1·68	1·99	2·06	2·65	
October	3·16	4·90	2·40	3·35	2·21	5·53	3·8	5·6	3·3	2·8	1·84	2·79	5·1	4·30	4·00	4·75	1·71	1·85	2·08	2·81	
November	3·25	5·55	2·55	4·10	2·43	5·66	4·0	5·5	3·4	2·9	2·03	3·03	4·9	4·63	4·23	4·65	1·85	2·05	2·17	2·99	
December	3·30	5·10	2·50	3·33	2·61	5·41	4·2	5·7	3·6	3·0	2·29	3·15	5·8	5·31(5)	4·63	5·52(5)	1·95	2·08	2·29	2·85	

(1) Data worked out by Author, except for Norway, for which they are taken from *Folkemaengdens des Bevaegelse 1866-1885*.—Kristiania, Aschehoug & Co., 1890, Page 184, and for Prussia, Saxony, Austria and Budapest, for which the data are taken from PRINZING, *Handbuch der medizinischen Statistik*. P. 57. The original data were taken by the Author from official statistics except those for the stillborn according to months in Amsterdam, which were sent in MS. to the Author from the office of municipal statistics. (2) °/₀ of stillborn on total born alive and dead. (3) °/₀ of stillborn on those born alive. (4) Stillborn at termine. (5) Delay in notification of births occurring at the end of the year, referring to those born alive only has considerable influence on the °/₀ of stillborn in December, raising the °/₀ in January and lowering it in December.

countries and Table XIII. gives more detailed data according to months. We generally find one high maximum of the still-born among the winter births, sometimes equalled in the autumn period, and another maximum less marked in the hottest months of summer. The still-born then are seen to be most numerous precisely in connection with spring conceptions, in complete contradiction to what one would expect were spring regarded as the original season of reproduction for the human species.

TABLE XIV.

Mortality during first month of life according to month of birth (1) *on* 100 *born alive in the first month.*

Month.	Upper Italy.	Central Italy.	Lower Italy.	Italy.	Trieste.	Rome.	Florence.	Cagliari	Sassonia	Budapest.
	1872-80	1872-80	1872-80	1872-80	1909-11	1889-1911	1904-05 1907-00	1905-11	1880-84	1896-1900
1	2	3	4	5	6	7	8	9	10	11
January	17·4	15·9	9·3	13·2	8·7	6·6	11·4	7·5	5·7	5·0
February	16·3	14·2	8·3	12·1	8·6	6·9	11·2	9·4	5·3	4·3
March	15·7	13·8	8·4	12·0	8·4	5·4	8·9	6·2	6·0	5·6
April	10·4	9·2	6·5	8·5	7·7	4·7	6·6	6·0	6·3	4·6
May	9·0	7·5	5·7	7·4	5·3	4·1	7·3	3·8	7·2	4·9
June	7·6	5·8	5·3	6·5	6·1	4·7	6·9	4·3	7·3	4·3
July	8·1	6·8	6·5	7·2	4·6	4·9	9·0	6·1(2)	9·6	5·6
August	7·5	6·1	6·4	6·8	6·0	4·6	9·4	5·0(2)	9·2	6·4
September	6·9	6·0	5·8	6·4	6·1	4·1	5·8	4·9	8·4	4·8
October	8·2	7·5	6·4	7·3	5·4	4·5	5·5	6·0	7·1	4·8
November	11·7	10·6	7·2	9·4	6·9	5·3	7·1	5·0	5·7	4·3
December	14·8	13·6	8·3	11·5	8·1	6·3	8·5	8·3	5·7	4·8

We might allow this, were it not that it is most probable that the most decisive factor here is not the season of conception, but the season of delivery, and the variation in the number of still-born in the different months is due to the more or less favourable external conditions rather than to a greater or less degree of vitality of the organisms. A proof of this may be found in the fact that in hot countries (such as Sicily, Spain, Mexico, Bengal) the summer maximum for the still-born nearly reaches, and sometimes exceeds, the winter maximum, while it disappears altogether in colder countries.

10. The month of birth also has a decisive influence on the mortality during the first few days of life; but, what *a priori* seems peculiar, it has a contrary influence as regards the number of the still-born. I say a contrary influence, because the number of still-born is a maximum in winter in cold countries, and is nearly as great or even greater in summer in hot countries. Mortality during the first days of life appears to be greatest in the cold months of some countries relatively hot, and in the hot months of some countries

TABLE XV.

Mortality during first month of life according to month of birth (1).

Month.	Making the daily mean for the whole year = 100, the daily mean for each month =								
	Denmark (1901-905).			Saxony (1901-905)					
		Died			Day of Death				
	Births	First day of Life	Rest of the Month	Births	1	2-7	8-14	15-21	22-30
1	2	3	4	5	6	7	8	9	10
January ...	98	93	96	99	93	99	85	72	83
February...	103	102	*104*	103	95	101	85	78	88
March ...	107	104	91	100	97	98	78	73	63
April ...	107	102	106	101	*102*	*102*	83	80	80
May ...	103	*115*	99	101	*118*	99	85	86	80
June ...	100	*107*	100	103	*115*	*108*	*104*	*107*	*104*
July ...	97	*106*	99	103	*115*	*113*	*127*	*132*	*129*
August ...	100	98	*117*	100	*108*	*105*	*152*	*171*	*179*
September	102	90	*117*	103	95	99	*145*	*154*	*141*
October ...	95	96	93	96	88	89	*104*	*103*	*105*
November	94	93	88	95	90	88	81	75	79
December	94	94	90	96	92	99	71	69	69

(1) Data taken from Rœsle, *Die Sterblich-Keit un ersten Lebensmonat*, Leipzig, Vogel 1910, pp. 200 and 201.

relatively cold. This phenomenon is clearly shewn by Tables XIV. and XV. In Denmark and in Saxony the mortality during the first month of life appears to be greatest in summer, or at the beginning of autumn; at Budapest, besides the summer maximum, there is another not quite so marked in winter; in Italy, the winter months are by far the most unfavorable to the newly born, while one can only just notice the slight increase in mortality during July and August. Such differences are probably due to several causes: on the one hand, in colder countries the children are better sheltered from the rigours of the winter than in hotter countries; on the other hand, a different proportion in the number of the artificially fed may have a decisive influence (10), as this practice increases infant mortality especially in hot seasons. (See Table XVI.) (II.)

It is not hard to find a reason for the monthly variation in the numbers of still-born throughout the year; the number of the still-born depends in fact on the influence that the climate exercises, not upon the organisation of the child, but upon that of the mother, and adults cannot be protected from the inclemency of the weather so easily as the newborn: therefore, for adults the

TABLE XVI.

Mortality in the first year of life (1).

Daily mean of deaths for each month making daily mean for the whole year = 1,000.

Month of Death	Paris 1905-909 The children who died were		Berlin 1892-96 The children who died were		
	Naturally Fed	Artificially Fed	Naturally Fed	Fed on Animal Milk	Fed on Substitutes for Milk
1	2	3	4	5	6
January	*1207*	927	*1170*	688	480
February	*1255*	823	*1046*	759	569
March	*1114*	888	998	777	530
April	*1130*	877	853	722	432
May	*1011*	860	865	877	505
June	953	800	884	*1074*	980
July	824	*1148*	*1044*	*1872*	*2082*
August	783	*1838*	*1221*	*2093*	*2821*
September	884	*1245*	932	*1176*	*1680*
October	820	941	942	718	690
November	934	840	979	574	637
December	*1086*	810	*1066*	671	591

(1) Data worked out by the author. The original data for Paris were taken from *Annuaire Statisque dela ville der Paris ;* those for Berlin were taken from Westergaard, *Die Lehre van der Mortalitat und Morbiditat*, Jena, Fischer, 1901. Page 305.

mortality is greatest in summer for hot countries, and in winter for cold ones, and the number of still-born is affected in the same way month by month.

We are able to say in conclusion that the variations shewn in the numbers both of still-born and of children expiring in the first month of life according to their month of birth, if they do not exclude the idea that the month of conception may exercise some influence on the vitality of the child, allow us to assert that such influence, if it exists, is totally obscured by the influence of the season of delivery.

11. An interesting problem still remains to be solved : whether the month of birth, besides having a direct influence on mortality during the first few days of life, has also an indirect influence on the resisting powers of the organism in after life.

Is mortality in after life independent of the season of birth? And, if so, is there in after life any difference in resisting powers according to the season of conception?

Or does mortality during the first months of life possess a selective character, so that the stronger organisms, who have been able to survive a more unfavourable environment, will shew a smaller mortality, which will slowly establish an equilibrium in the number of survivors?

Or does the unfavourable or favourable influence of the season of birth, besides causing immediately a greater or less mortality, make itself felt by

rendering those organisms which have survived weaker or stronger as the case may be, so that even in after life those born in unfavourable seasons will shew a greater mortality?

This, as everyone will understand, is a problem that touches not only Eugenics, but also upon actuarial calculations. We must remember, however, that just as in different countries the direct influence exercised by the season of birth on mortality in the first months of life may differ, so its influence exercised upon mortality in after life may differ.

I have caused special investigations to be made relating to the age of death according to the month of birth, in the municipal office of statistics at Rome and Cagliari.

TABLE XVII.

Mortality according to the month of birth (Rome 1908-1910*).*
In every 10,000 *dead the number, according to month of birth, who die at an age exceeding* x.

Month of Birth	Age (x)				
	1 year	5 years	20 years	40 years	60 years
1	2	3	4	5	6
January...	7534	*5314*	*4467*	*3543*	*1940*
February	7628	5633	4958	3829	2102
March	7823	*5954*	*5168*	*4203*	*2548*
April	*7854*	5790	4952	4038	2235
May	7829	5847	5150	4028	2216
June	*7280*	*5523*	4847	3856	2280
July	7436	5528	*4723*	*3725*	*2101*
August	7564	5628	4923	3750	2167
September	*7857*	*5766*	*4957*	*3895*	2177
October	7621	5748	4935	3869	2201
November	7530	5601	4795	3699	2081
December	*7433*	5511	4790	3708	2022

In Rome the data were worked out from the list of deaths in the City during the three years, 1908 to 1910. The work of selection was done by the kind permission of Comm. E. Pellissier, *direttoré dell' Ufficio*, under the careful direction of 'Avv. A. Mancini, superintendent of the *Lavori Statistice del' censimento*. Very often the month of birth is not in the lists, either because they refer to people who were only temporarily resident at Rome and of whom there was no trace either in the registers of *Stato Civile* or in the census records, or through lacunae in the records themselves, or through actual deficiencies in the completed lists. It is therefore impossible to map out a really accurate table of survival according to month of birth; but we can determine how many of the dead whose month of birth is known were of an age exceeding X. The results of this calculation are shown in Table XVII. We must remember that there is no reason to suppose that the lacunae found in the mortality lists have any relation to the month of birth, and therefore we should expect that, if a sufficiently large number of observations had been

taken, the error would probably be the same for those born in different months. If the heads under which the dead are classified be arranged, as we took care to do, in such a way that the number of observations included in each of them is not too small, we may rightly assume that the survivals at an age X of those born in a month *a*, will be greater than in the case of those born in a month *b*, so long as the dead who are known to have been born in the month *a* shew a percentage above an age X greater than those known to have been born in a month *b*.

Table XVII. shews that survival depends to a considerable extent upon the month of birth; it shews two maxima referring to the mild months of March to April, and September to October, and two minima referring to the months having extremes of temperature, December-January and June-July. The regularity which these figures present is too marked to be considered accidental.

In Table XVIII. these data have been grouped according to seasons of birth, which has enabled us to deal with smaller limits of age without reducing too much the number of cases included in each. Again the results of this table shew a really striking regularity. At all ages, starting from three months, survival is a minimum for those born in winter; and at all ages, starting from nine, it is a maximum for those born in spring.

With increase of age the differences do not diminish at all, but become greater, leading us to think that not only early but also later in life mortality

TABLE XVIII.

Mortality according to season of birth (*Rome* 1908-1910).

In every 10,000 *dead the number, according to month of birth, who died at an age exceeding X.*

Age (X)	Season of Birth, Winter	Spring	Summer	Autumn
1 month	8624	8914	8676	9012
3 months	8244	8614	8352	8640
6 ,, ...	7973	8370	8115	8332
9 ,, ...	7742	8184	7842	8011
12 ,, ...	7532	7835	7431	7669
2 years	6328	6620	6252	6470
3 ,, ...	5859	6228	5842	6039
5 ,, ...	5481	5868	5561	5705
9 ,, ...	5229	5541	5352	5372
12 ,, ...	5106	5418	5255	5310
15 ,, ...	4829	5304	5123	5201
20 ,, ...	4730	5093	4831	4895
25 ,, ...	4446	4840	4565	4605
30 ,, ...	4213	4608	4278	4329
40 ,, ...	3689	4095	3775	3820
50 ,, ...	2994	3383	3102	3122
60 ,, ...	2020	2343	2180	2152

TABLE XIX.

Mortality according to season of birth (*Rome*, 1908-1910).
Probable number of deaths at an age X., according to season of birth, having made the probable number of deaths, considering the total number of offsprings, = 1,000.

Season of birth	Age X				
	0-1 year	1-5 years	5-20 years	20-40 years	40-60 years
1	2	3	4	5	6
Winter	1036	1054	1011	1033	1040
Spring	909	972	975	919	983
Summer	1079	975	969	1025	971
Autumn	979	993	1047	1030	1004

is above the mean for those born in winter, and below it for those born in spring. Those born in autumn shew at all ages up to fifty a greater number of survivals than those born in summer; but these differences, very marked to begin with, gradually decrease, until at 60 years of age the number of survivals is greater for those born in summer, leading us to believe that contrary to what happens in the earlier period of life, mortality in later years is greater for those born in autumn than for those born in summer.

These inferences are comfirmed by the data of Table XIX. which shews the relative degree of mortality at different ages according to season of birth. (12). In all the age groups, mortality for those born in winter is found to be above, and for those born in spring below, the average. For those born in summer the mortality appears very high in the first group from 0 to one year, and usually low in later years; for those born in autumn, on the contrary, the mortality is below the mean for the first two age groups, and above it in later years.

Summer and winter appear to have an entirely different kind of deleterious influence on the organisation of the child: the unfavorable influence of summer seems, as a rule, to possess a selective character, eliminating the weakest organisms and allowing organisms to survive, which will afterwards shew a mortality below the mean; the bad influence of winter, however, appears to have a permanent character, for not only does it kill many children, but it weakens the constitution of the survivors. This difference is explained by a consideration of the causes of the illness and death of children during summer and winter. In summer the danger is caused essentially by maladies of the digestive system, which, though dangerous, usually leave no permanent weakness. The danger in winter is due to the graver nature of other maladies,

especially those closely connected with the incomplete development of the child (13). It is therefore natural that among those born in winter, at least in countries where they are not properly sheltered from the inclemency of the season, not only should there be a high mortality, but that recovery in the case of those who manage to survive should not be so complete as it would have been had they been born in other seasons.

The seasons favourable to the life of the newly-born during their earlier stages shew analogous differences to those found for the unfavourable seasons. The favourable influence of spring seems permanent, that of autumn *counter-selective.* Does the influence of the season of conception come into play here? It seems to me rather rash to assert that it does. Or does the influence of the different seasons in which natural feeding usually ceases for those born in spring, as compared with those born in autumn, come into play?

It is known that the change in diet which takes place when natural feeding ceases is a matter of great importance as regards the health of the child. If, then, those born in autumn should cease to be naturally fed in summer (the dangerous season for maladies of the digestive system), usually or more frequently than those born in spring, we might find in this a state of affairs dangerous to their health; but I am not in a position to decide whether this really is so, and to what extent it may affect the vitality of the organism in later life.

The data for Cagliari, both as regards quantity and quality, are much less important than those for Rome. They were taken from the registers of births extracted by the employees of the Movimento Dello Stato Civile under the direction of Cav. Medda Secchi, secretary to the Stato Civile.

In the register of births for the town of Cagliari, the date of death is entered opposite that of the birth, no matter whether the person concerned died in the town or outside. In many cases, however, this circumstance had to be disregarded. The number of dead of different ages resulting from the figures is in fact incompatible with that shown by the mortality statistics.

However, since the lacunae are certainly independent of the month of birth, it will not be uninteresting to shew the result obtained.

Those born during the years 1902-11, who died before March 7th, 1912, were taken into consideration. The dead were divided into eight age groups, according to whether they died before the 6th of the third month after birth, during the year following this date, or during the 2nd, 3rd, 4th, 5th, 6th or 7th years after. For instance those born in December, 1902, dead before 7th March, 1912, were classified according to whether they died before the 6th of March, 1903, or between the 7th of March, 1903, and the 6th of March, 1904, or between the 7th March, 1904, and the 6th of March, 1905, or between 7th March, 1905, and the 6th of March, 1906, ... or from 7th of March 1911, to 6th of March, 1912. Obviously the more recent

TABLE XX.

Deaths according to seasons of birth.
Births in Cagliari during the years 1902—11.
Annual average of births and deaths in each season.

	Years	Season of birth				Total number of observations
		Winter	Spring	Summer	Autumn	
Born (living and dead)	1905-911	421	381	369	396	1566
Born in month x and dead before 6th day of month x + 3 ...	1902-911	24·5	14·2	15·4	18·3	724
Dead 1 year after	1902-910	37·2	35·2	34·2	36·0	1284
,, 2 years ,, ...	1902-909	22·1	17·0	15·9	18·0	591
,, 3 ,, ,, ...	1902-908	7·0	8·1	6·1	7·0	198
,, 4 ,, ,, ...	1902-907	4·2	5·0	2·3	3·8	94
,, 5 ,, ,, ...	1902-906	1·8	2·8	1·8	2·8	46
,, 6 ,, ,, ...	1902-905	2·0	2·7	2·2	2·2	37
,, 7 ,, ,, ...	1902-904	1·3	2·3	2·7	1·3	23

TABLE XXI.

Mortality according to season of birth.
Births in Cagliari during the years 1902—11.
Daily mean of births or deaths, according to the season of birth, having made the daily mean of births or deaths for the year = 100.

	Season of birth			
	Winter	Spring	Summer	Autumn
1 Born	109	97	93	101
2 Dead before 6th day of 3rd month after birth	136	78	84	101
3 Dead during 1st year following	106	98	95	101
4 Dead during 2nd year following	121	91	85	103
5 Dead during 3rd to 7th year following ...	95	120	86	99
6 Dead between 1st and 7th years following ...	107	102	91	101
7 Dead in all 4 periods	116	95	89	101

the year of birth the smaller is the number of age classes for which data can be obtained. The births of 1902 will furnish data for the eight classes, those of 1911 for one class only.

Table XX. gives the yearly mean of births (1905-11) and deaths for different age classes according to season of birth; and Table XXI. gives the daily mean of births and deaths for each age class, according to the season of births, having made the daily mean for the whole year = 100. In this table it seemed advisable, considering the scarcity of data, to combine the last five age classes into one.

From Table XXI. we see how amongst those born in winter the number of deaths before the 6th day of the 3rd month after birth (line 2) is more than proportional to the number of births (line 1); in the following years (lines 3-5) the number of deaths is sometimes more and sometimes less than proportional to the number of births; but on the whole (line 6) the results turn out to be less than proportional.

The contrary happens to those born in spring. For those born in summer the number of deaths is less than proportional to the number of births; for those born in autumn it is practically proportional in all seasons.

If we consider the number of deaths in the four periods taken together (line 7), they turn out to be proportional to the number of births for those born in autumn, more than proportional for those born in winter, and less than proportional for those born in spring and summer.

Generally speaking, considering those born in all seasons, there seems to be some sort of a balance between the mortality during the first three months of life and that during the seven following years. But it is not sufficient at any rate to make the survival at the end of this period equal for those born in the different seasons.

These results for Cagliari differ in several points from those for Rome. But we should not expect, as I said before, that the influence of the season of birth on mortality in after life should manifest itself in the same way and to the same extent in all countries. The violent winds which disturb the spring, and the breezes which greatly diminish the summer heat, may well explain why summer is the most favourable season of the year for Cagliari. But in any case we consider that the limitations on our observations, and the numerous lacunae in our data, warn us to take the results for Cagliari with considerable reserve.

12. The question of the influence of month of birth could be solved, not only in regard to survival, but also in regard to physical, intellectual and moral characters, by examining the month in which those people are born who depart far from the normal, either above or below (such as centenarians, scientists, artists, politicians, athletes, lunatics, criminals, etc,). The census list, conveniently reinforced by the data of the *Stato civile*, the biographies of illustrious men, the registers of lunatic asylums and gaols, and the lists of Members of Parliament, could give us a large harvest of data for such research.

TABLE XXII.

Illustrious men and Italian Senators according to season of birth.

Nationality	Season of Birth				Total.
	Winter	Spring	Summer	Autumn	
Contemporary writers (De Gubernatis).					
1 Italy	*268*	240	*203*	243	954
2 France & Belgium	*433*	412	*354*	394	1593
3 Spain & Portugal ...	18	*24*	*14*	*24*	80
4 Austria-Hungary & Switzerland ...	*181*	144	*141*	144	610
5 Germany	*298*	296	262	*221*	1077
6 England & United States	*105*	*77*	84	97	363
7 Denmark, Holland, Sweden & Norway	*38*	30	29	38	135
Total	*1382*	1246	*1109*	1186	4923
Daily mean, after making the daily mean for the year = 1,000	*1136*	*1004*	*894*	*967*	*1000*
Illustrious men (Mantegazza).					
8 Different Nationalities	*1000*	747	*680*	828	3255
Italian Senators (1848-1912).					
9 Italy	377	380	*373*	*404*	1534 (1)
Total of observations.					
Total	2759	2373	*2162*	2418	9712
Daily mean, after making the daily mean for the whole year = 1,000	*1150*	*970*	*884*	*999*	*1000*

(1) Data missing for 37 Senators.

The results I can bring forward are intended rather to encourage others to engage in the pursuit of these enquiries with a larger and more varied collection of materials than to explain very much by themselves (see Table XXII.).

Some of the results are derived from a careful search of the "Dictionnaire international des écrivains du jour, de Gubernatis" (Florence. Niccolai, 1891) kindly made by Dr. E. Porru. The data deal with about 5,000 writers, divided into seven groups according to the state in which they were born.

Another part of the result was obtained from an examination of the biographical records of Italian Senators, specially carried out at the *Segreteria del Senato* by Dr. Luigi Ferrari, assistant librarian to the Senate. These records concern all persons raised to Senatorial rank from 1848 to 1912, whether they have allowed the decree to lapse or whether they have taken advantage of the honour or not. We do not know the month of birth of 37 Senators.

Other data have been published by Mantegazza (14); they referred to material rather heterogeneous but abundant enough (3,255 observations), referring to persons who for any reason could be considered illustrious.

We have, therefore, nine sets of data altogether. In seven of these the largest number of births occurred in winter, and in seven, too, the smallest number of births occurred in summer; where the maximum does not fall in winter, it falls in spring or autumn, never in summer; and where the minimum does not fall in summer, it falls in autumn or spring, never in winter. We may therefore conclude that the births of eminent people occur with the greatest frequency in winter, and least frequency in summer. If we put together the nine sets of data, a process entailing some repetition, we find that the births in winter are to those in summer as 1150 to 884.

The difference certainly depends mainly on the relative frequency of births in the different seasons. In Europe, to which most of our data refer, a maximum occurs in winter and a minimum in summer. But they seem higher than for births in general.

This, perhaps, depends upon the limited number of observations. Let us note, however, that the advantage of winter and the disadvantage of summer is uncertain for the Senatorial class, marked for the writers of the present day, and exceedingly marked in the case of highly illustrious persons. Does not this lead us to suspect that there is a relation between such a gradation and the gradations of rank of the three groups? Illustrious men are certainly those who emerge mainly owing to their intellectual powers; after them come the present-day writers, not all of whom will become famous; last in order I should put the Italian Senators, for though compared to the rest of humanity they always represent the results of selection, they are none the less very often chosen, as everyone knows, more for their administrative or political merits, or for financial reasons, than for high intellectual powers.

TABLE XXIII.

Influence of the Season of Birth on Physical Development at 11 *years of age.* (*Middlesboro'*: *Those born between* 1898 *and* 1905).

Month of Birth	Number of observations	Mean stature in inches	Mean weight in pounds
January-March	83	51·6	61·45
April-June	82	50·62	60·84
July-September	92	49·95	57·89
October-December	79	50·33	57·88

TABLE XXIV.

Influence of the Season of Birth on Survival at end of Sixth and Seventh Year of Life (Middlesboro' : Born between 1898 *and* 1905).

Month of Birth	Survivors at Birth		Survivors at end of 6th year		Survivors at end of 11th year	
	Absolute number	per 1000	Absolute number	per 1000	Absolute number	per 1000
January to June	3600	*519*	2320	*559*	3040	*597*
July to December ...	3340	*481*	1860	*441*	2060	*403*

These results must be taken with great reserve, especially as they could not be foreseen, considering the opposite conclusion arrived at on our other lines of research as to the influence of the season of conception on the character of offspring.

If, however, more extensive investigations should confirm these facts, it would be quite right to say that in the season when conceptions are most frequent in Europe the conception of persons intellectually eminent is most likely and that the contrary happens for the season in which conceptions are less frequent.

Ewart, as quoted above, considered that he had discovered that spring, and in a less degree summer, exercised a favourable influence on the physical characters of those conceived. I here show his tables (Tables XXIII. and XXIV.)

The number of observations, as far as weight and stature are concerned, is certainly too small, and the classification of births as regards survival of offspring appears to be arbitrary. Let us add that it is not at all clear how the data in Table XXIV. are obtained. The absolute number given for survivors at 11 years of age is greater than that given for the survivors at six years of age, and this suggests that the people considered at birth are not those considered at six or 11 years of age. In this case a very much larger number of observations would be necessary to justify us in taking any notice of these results.

13. Let us briefly recapitulate the conclusions arrived at in this chapter. The idea that in spring there is a natural maximum of conceptions, owing to man's greater fertility at that time persisting as an atavistic survival of an original season of reproduction, though it seemed likely to explain the periodicity in the births throughout the months in Europe, finds no confirmation in the data which have been gathered from other countries.

The frequency in *plural births*, in miscarriages, in stillborn, according to months, and mortality according to month of birth, makes it impossible to discover any influence caused by month of conception on the characteristics

of offspring. Some researches conducted by Ewart on the stature of children according to month of birth, and other researches on the month of birth of illustrious men, seem to show indeed the favourable influence of spring on the physical development and on the intellectual quality of those conceived. But Ewart's researches are founded on too small a number of observations, and the influence of the month of birth on the frequency of the appearance of illustrious men is not sufficiently defined to be admitted without other investigations.

It has, on the contrary, been ascertained that births occurring in those seasons of the year when extremes of climatic conditions are experienced are injuriously affected by that fact. Those conceived in spring, being born in winter, find themselves at the commencement of their lives subjected to an unfavourable environment which, at least so far as Rome is concerned, not only increases immediate mortality, but also seems to diminish vitality in after life. There is, therefore, no reason to think that the fact that the human species reproduces itself at all seasons of the year should have any directly deleterious consequences on the characteristics of offspring: it is, on the contrary, probable that if the human species reproduced itself only in spring, as is the case with many species of the higher animals, the offspring, being born in winter, would find themselves, at least in those countries where inadequate measures are taken to resist the rigours of the climate, in worse conditions than they are now.

Chapter III.

On the Interval between each Successive Delivery.

14. If the possibility of generation at any season of the year cannot as has been shown, have any directly deleterious influence on the vitality of human offspring, it can none the less have indirect deleterious consequences, in so far as it allows pregnancies to succeed one another at too short intervals.

Another circumstance helps in many civilised races towards such a result; this is the habit of cutting short natural feeding before the natural period, a practice causing an earlier reappearance of the menstrual discharges, and therefore the possibility of a new conception (15).

If the human species, like the species of higher animals, were monomenstrual, and if we allowed natural feeding for as long as nature seemed to require it, all the births occurring at less than two years after the preceding one would be excluded. Pregnancy, in fact, lasts, as is commonly known, nine months, and the reappearance of the monthly discharges when natural feeding is not interrupted seems to occur regularly at a period of more than three months after delivery (16).

In white races it seems, from the data to hand up to the present, that more than half the number of second births occur less than two years after

Number of Second Births according to Interval after Preceding Birth(1).

TABLE XXV.

Interval after preceding birth.	Chemnitz (1904-905)		England Upper Classes (1874) (2)		Employés at the central administrations of the ministries France (1905)		Railwaymen in City of Paris (1905)		Paris workmen (1905)		TOTAL	
	Number of births	Percentage and totals	Number of births	Percentage and totals	Number of births	Percentage and totals	Number of births	Percentage and totals	Number of births	Percentage and totals	Number of births	Percentage and totals
1	2	3	4	5	6	7	8	9	10	11	12	13
1 year or less	514	*4·6*	1949	*9·1*	12	*1·1*	212	*1·9*	145	*2·2*	369	*2·6*
1-2 years	6118	*53·2*	12415	*58·3*	213	*19·5*	1945	*17·5*	1177	*18·1*	3335	*17·9*
Less than 2 years	6632	*57·7*	14364	*67·4*	225	20·6	2157	*19·5*	1322	*20·4*	3704	*19·9*
TOTAL	11498	*100·0*	21302	*100·0*	1094	*100·0*	11086	*100·0*	6477	*100·0*	18657	*100·0*

(1) The Data for Chemnitz were taken by the Author from *Monatliche Mitteilungen* of this town; those for England are taken from WESTERGAARD Page 371 and were taken by this Author from CH. ANSELL *Statistics of Families* 1874; those for France are taken by the Author from *Rapport préliminaire de la Commission statistique des fonctionnaires Rapports au Conseil supérieur de statistique.* Bulletin numero 10, Paris Imprimerie Nationale 1908.

(2) Year of publication of the figures.

the preceding birth: the percentage works out to 58% in Chemnitz, and to 67% in well-to-do English families. Much lower, on the contrary, is the percentage among French employés (20%), probably because of the demographic conditions peculiar to the French nation. (See Table XXV.)

TABLE XXVI.

Infant Mortality according to the Interval between a Birth and the Preceding Birth. Well-to-do English Families(1).

Order of birth	Interval between birth and preceding birth		
	1 year and less	1-2 years	more than 2 years
Number of deaths in first year of life per 100 born.			
2	16	7	6
3	15	8	6
4	15	9	6
5-6	16	9	7
7-9	12·5	10	9
10 and more	20	13	10
Total of others than first born	*15·3*	*8·9*	*7·2*
Number of deaths in first 5 years of life per 100 born			
2	20	12	11
3	19	12	11
4	20	14	10
5-6	21	14	11
7-9	18	15	14
10 and more	23	18	15
Total of others than first born	*19·9*	*13·6*	*11·8*
Number of deaths between 2nd and 5th year of life per 100 survivors at one year.			
Total of others than first born	*5·3*	*5·1*	*5·0*

(1) The Data for this table were taken from WESTERGAARD, Page 371, who took them from *Statistics of families* (1874) CH.

The deleterious consequences which too short a period after the preceding birth have upon the vitality of the child are indisputable, at least during the first year of life. This is shown by the data of Table XXVI., and I should not be surprised if a sufficiently large number of observations were found to confirm the results of Ewart (based upon too small a number of observations to be accurate), according to which the height, weight, and

TABLE XXVII.

Physical and Intellectual Development of Children at 6 years of Age according to the Interval between their Birth and the Preceding Birth. (*Middlesboro', births* 1898-1905.) (1)

Interval between a birth and the preceding birth	Physical characters			Intellectual characters			
				Children of parents between 25 and 35		Children belonging to well-to-do classes	
	Number of observations	Mean stature in inches	Mean weight in pounds	Number of observations	Percentage of children classified as above the average intelligence	Number of observations	Percentage of children classified as above the average intelligence
Less than 2 years ...	156	38·6	37·2	217	31	137	37
2—2·5 ,, ...	180	39·9	38·8				
2·5—3 ,, ...	172	40·3	39·1				
Three years and more	154	41·7	39·4	85	32	85	42

(1) Data taken from R. J. EWART. *The influence of parental age on offspring.* (*The Eugenics Review*, Vol. III., No. 3, October, 1911). Pages 211 and 220.

mental capacity of children at six years of age are more or less sensibly inferior, as the period elapsing between one birth and another is shorter. (See Table XXVII.)

It is not wise in any case to exaggerate the benefits which might accrue to the human race from a long interval between consecutive births: if this were always greater at two years, mortality in the first year of life would fall, according to Ansell's data, from 8·9 to 7·2%, but in the four following years it would only fall from 5·1 to 5% of survivors at the end of the first year.

NOTES.

(1)—Number of survivors at 20 years of age in every 10,000 born in these counties:—

Table of survival referring to		Years to which the Table refers	Survivors at age of 20, on every 10,000 born.
INDIA ...	Males	1901	4516
,, ...	Females	,,	4519
SPAIN ...		1880–84	4960
IRELAND ...		1881–90	7767
DENMARK ...	Males	1895–900	7671
,, ...	Females	,,	7855
SWEDEN ...		1891–900	7816
NORWAY ...	Males	1891/92–1900/901	7770
,, ...	Females	,,	7997
WEST. AUSTRALIA	Males	1899–902	7727
,, ,,	Females	,,	8075

See *Statistique internationale de la population*, published by *Statistique Générale de la France*. Paris. Imprimerie Nationale, 1907.

(2)—At three years exactly 90,645 horses survive out of every 100,000 born. See Caramanzana, *Ensayo de una "Table de Mortalidad" de los équidos domesticos*. Cor. published in the Boletin Oficial de Seguros Ministerio de Formento, 1910. Madrid, R. Rojas.

(3)—From the tables of mortality in the above-mentioned *Stat. internat. de la population*, I find the maximum number of survivors after the first year of life = 9,054 in every 10,000 born in Ireland (1881-90), and = 8,947 in every 10,000 males and 9,132 in every 10,000 females born in Norway (1891-92—1900-01). The minimum survival at one year of age is given by Baden (1881-90) with 7,163, by Saxony (1900) with 7,232, and by India (1901) with 7,146 survivors for the males, and with 7,412 for the females in every 10,000 born. The survival at one year of age amongst the native population of Egypt appears to be even smaller according to the data found in the Annuaire Statistique de l'Egypt, 1911. Ministère des finances. Direction de la Statistique. Lecairè, Imprimerie Nationale, 1911. Between 1902 and 1910 deaths under one year of age represented 28·94% of the births.

(4)—These are the co-efficients of mortality between one and 17 years according to the calculations of Caramanzana and the observations of the "Scandinavian Society for the Insurance of Live Stock."

Age in Years.	Death Rate for Horses.	
	Caramanzana	The Scandinavian Society for the Insurance of Live Stock
1	2·10	1·98
2	2·20	1·32
3	2·30	1·34
4	2·40	1·60
5	2·50	1·85
6	2·60	2·01
7	2·70	2·21
8	2·85	2·47
9	3·00	2·54
10	3·15	2·90
11	3·30	2·82
12	3·45	3·28
13	3·60	3·40
14	3·75	3·94
15	4·00	4·03
16	4·50	4·03
17	5·00	4·15

The difference would be somewhat higher if we could take into account the fact that the co-efficients of the Scandinavian Society include disabled horses, and are, therefore, rather higher than they would be were death only taken into account. The number of horses insured was :—

6,000 at end of 1892 ; 39,000 at end of 1895 ; 62,000 at end of 1900 ; 101,000 at end of 1905 ; 105,500 at end of 1910.

For further information see the article *L'assurance du bétail en Suède et les nouvelles tables de mortalité des chevaux* in the *Bulletin du Bureau des institutions économiques et sociales*, second year, Number 8. 31/8/11. Rome. Imprimerie de la chambre des deputés, 1911.

(5)—See for these data H. Westergaard. *Die Lahre von der Mortalität und Morbilität.* Jena Fischer, 1901. Pp. 402-3 and 489.

(6)—We must, of course, consider for the two species classes of age comparable with one another ; and we may fairly say that, considering development, five years in man is equivalent to one year in the horse.

In Germany (1900-1907) and in Luxemburg (1901, 1904, and 1907) the register of the number of horses gave a total of 422,724 under one year of age. The total number of births registered during the preceding twelve months was 440,547. The total births in one year were to the number of horses alive under the age of one year as 100 to 96. In Italy the 1901 census gave 4,116,511 persons under five years ; while in the five years between 1896 and 1901 there were 5,423,361 births. The total births in five years were, to the number of survivors under five year, as 100 to 76 according to the census.

In Hungary (1895), in Germany (1900 and 1907), and in Luxemburg (1901, 1904, and 1907) there were on the average 407,531 horses under one year, and 398,150 between one and two years of age. Those between one and two years of age were to those under one year of age as 98 to 100. In Italy, in 1901, persons between five and ten years of age (3,564,781) were to persons under five years (4,116,511) as 86·5 to 100.

In Norway (1900 and 1907), Denmark (1893, 1898, and 1903), Belgium (1900-1908), Hungary (1895), Germany (1900, 1904, and 1907), and Luxemburg (1901, 1904, and 1907) there were on the average 492,133 horses under one year, and 912,000 between one and three years. Those between one and three years were to those under one year as 185 to 100. In Italy in 1901 persons between five and 15 years of age (6,953,479) were to those under five years as 169 to 100.

In Germany (1900, 1904, and 1907), Luxemburg (1901, 1904, and 1907), Servia (1890 and 1900), and Bulgaria (1900 and 1905), the returns gave on an average 256,527 horses under one year, and 709,524 between one and four years. The number of these is to the number under one year as 277 to 100. In Italy, in 1901, persons between five and 20 years of age were 9,970,600 approximately ; they were to those under five years as 242 to 100.

We must remember that these comparisons are far from being accurate; the influence of migration in man, and of imports and exports in horses, and the difference in the relative number of births in the two species, will only allow them to bear the character of a rough approximation, the general accuracy of which we cannot determine.

For the data for Italian population see *l'Annuario statistico italiano* (1905-907 Fasc. 1.) Roma, Berto, 1907. For the data relating to equine species in different States see la *Statistique des superficies, cultivès, de la production végétale et du bétail dans las pays adhérents*, published by the *Istituto Internazionale di Agricoltura*. Roma. Tipografia della Camera dei Deputati, 1910.

(7)—R. J. Ewart. *The influence of parental age on offspring. The Eugenics Review.* Vol. III., No. 3, Oct., 1911

(8)—The date for Tables III. and V. referring to Greenland allow us to estimate at their proper value the assertions of F. Cook (*Journal of Gynecology and Obstetrics.* New York, 1894)—that among the Esquimeaux the sexual passion is arrested during the darkness of winter, so that births only occur nine months after the appearance of the sun; and they show once again how dangerous it is to use personal impressions for judging the behaviour of general phenomena. See Havelock Ellis. *Studies in the Psychology of Sex.* Vol. III.

(9)—For instance, if statistics tell us that an abortion is expelled in December, and that the period of gestation has been two to three months, it will be uncertain whether the month of conception was October or September. Similarly, if statistics tell us that an abortion is expelled in December, and that the period of gestation has been about two months (that is to say, nearer two months than one or three), conception may have occurred in October, September, or November.

The yearly returns of Vienna are divided into the following classes for the period of gestation in the case of abortions and still-born: less than one month; one to two months; two to three, ... eight to nine, and nine to ten months, to the limit. In the classification of abortions and still-born, according to the month of conception, the abortions with a duration of gestation between x and x + 1 months expelled in a month y were attributed half to conceptions y—x and half to conceptions y—x—1. The still-born at the upper limit of gestation period during month y were all put down to conceptions in the month y—9. For instance, abortions of two to three months of gestation expelled in December were held to have been conceived half in October and half in September, those still-born and completely developed during December were all held to have been conceived in March.

The yearly returns for Budapest are divided into the following classes for periods of gestation of abortions: one month, two months, up to seven months. In the classification of abortions according to month of conception, the abortions with a period of gestation of x months expelled in month y

were put down to conceptions in the month y—x. For instance, the two-month abortions expelled in December were held to have been conceived in October.

The yearly returns for Budapest give the still-born separately, according to month, without distinction of duration of gestation: this was considered to have lasted nine months, which is certainly true for most cases.

(10)—The following are the percentages of deaths during the first month of life according to method of feeding in Trieste, Budapest, and Berlin:—

Children whose system of feeding is known	Trieste 1910	Budapest 1903-905	Berlin 1904-905
Naturally	72·1	63·4	33·0
Partly, or entirely, otherwise ...	27·9	36·6	67·0

I lack similar data from Saxony, Denmark, and Italy; but we may state with certainty that the artificial feeding of children is a rare practice in Italy.

(11)—The data in Table XVI. refer to children expiring in their first year; the same results could have been obtained for those expiring in their first month. The yearly returns for Berlin show the number of deaths through maladies of the digestive organs during their first year, selected according to months of birth, and as to whether they died in summer or the other seasons.

For the two years 1904-1905 those expiring in summer represented a percentage among the dead as follows:—

Children Fed	Died during their	
	1st month	1st year
Naturally	33·0	37·2
On animal milk(*)	52·2	64·5
On substitutes (*)...	56·5	67·3

(*) Partly or entirely.

As we see, mortality due to maladies of the digestive organs is highest in summer for children artificially fed, both in their first month and in their first year. It is well known, too, that affections of the digestive organs are one of the worst consequences of artificial feeding.

There is no reason to think, on the other hand, that these data as well as those in Table XVI. should be affected by variations in the use of systems of feeding throughout the seasons.

We can well understand that the influence of artificial feeding on mortality, according to months, should be stronger in the case of those who died in their first year than in the case of those who died in their first month, owing to the less frequency of artificial feeding in the first year of life. These are the percentages of deaths in Berlin, 1904 to 1905, in the first month and first year of life according to method of feeding:—

Children Fed	Died in their	
	1st month	1st year
Naturally	21·5	9·4
On animal milk (*)	62·1	70·6
On substitutes (*)	16·4	20·0
Total	100·0	100·0

(*) Partly or entirely.

Similarly, the influence of artificial feeding on the mortality according to months will be in the first days of the first month less than in the following. This explains why the summer maxima in infant mortality in Saxony and Denmark (see Table XV.) are found to be, in the first days of life, not so high and not so protracted (for children artificially fed mortality is highest in July). (See Table XVI.)

(12)—In a stable population the number of survivors at an age x is equal to the number of dead of an age greater than x, therefore the expectation of death at an age x,—x,, is equal to the proportion of dead at an age x,—x,, (which we shall indicate by mx,—x,,) to the dead at an age greater than x, (which we shall indicate by mx,—oo). In the case of Rome the population is certainly not stable, and the numbers mx,—x,, , mx—oo, distinguished according to seasons of birth show, as has been mentioned, considerable lacunae. But we may admit by way of approximation that such lacunae occur with an equal frequency for those born in different seasons, and that the hypothesis of a stable population has upon the expectation of death an analogous effect for those born in different seasons. The relations, mx,—x,, , mx,—oo, concerning a given class of age and those born in different seasons, may therefore by way of approximation be considered proportional to their respective expectation of death. And the quotient of the proportion, mx,—x,, , mx,—oo, obtained for those born in a certain season, to the corresponding proportion obtained for those born in all seasons, may be considered proportional to the expectation of death at x,—x,, for those born in that season to the expectation of death for those born in all seasons.

(13)—This is how deaths between o and one month of age in Rome between 1897 and 1911 are distributed according to season and cause of death :—

Seasons of death	Numbers of those who died through immaturity or through maladies usually connected with immaturity †	Eclampssia	Numbers of dead due to maladies of the respiratory system	Numbers of dead due to maladies of the digestive system ‡	Numbers of dead from other causes	Total deaths
Winter	2283	308	224	269	125	3209
Spring	1529	200	61	252	93	2135
Summer... ...	1263	158	24	459	73	1977
Autumn... ...	1368	121	36	264	77	1866
Total	6443	787	345	1442	368	9187

These data are also the result of an investigation carried out under the direction of Avv. Mancini by the order of Comm. Pelissier.

(14)—P. MANTEGAZZA. *Igiene dell' amore.* Milan, Brigola, 1879. Pp. 266-267.

(15)—This is one of the evils indirectly caused by artificial feeding. The direct evil caused by it, in increasing infant mortality, is certainly worse. Research on this subject dates back to Villermè, and has been lately made wider and more accurate by Silbergleit, Sterneberg, Methorst, and Huber.

In a work, published in 1905, Silbergleit showed that for Berlin the mortality of children naturally fed during the first year of life was equal to 5·7%, and rose to 23·4% among those fed on cow milk.

At Nimega Sterneberg found a mortality of 5·3% for children naturally fed and 35·5% for the others. At the Hague the mortality for those born in 1908 was 3·44% in the case of children naturally fed for at least eight weeks, and 11·86% for those artificially fed. In France amongst children sent out to be nursed in 1907 the mortality for the first year of life for those naturally fed was 33%, for the others it was 50%; but probably, as Huber says, the difference is really greater than is indicated by these figures, owing to the fact that some of the children considered as naturally fed sometimes have to receive additional nourishment.

It is, however, impossible to decide how far the differences shown are due to differences in feeding or how far they may be due to differences in the

actual strength of the children, the care taken of them, and the frequency with which they are sent out to be nursed, and perhaps to other things.

(*a*) It is often necessary to resort to artificial feeding when the mother is suffering from a contagious illness, or when nursing the child would seriously compromise her health, or when her milk is either small in quantity or poor in quality: all these circumstances are always, or often, to be found in company with a constitutional weakness in the mother which is reflected to some extent in the organisation of the child; therefore, if those children who are now naturally fed, were fed artificially they would show a lower mortality than those who are now fed artificially.

(*b*) When artificial feeding has not been resorted to for these reasons, it has been adopted either through ignorance, carelessness, or want of affection on the part of the parents; and it is natural that parents either ignorant or careless or wanting in affection for their children should take less care of them, and be less able to keep them from those dangers which, apart from the system of feeding, endanger their fragile lives.

(*c*) Children sent out to be nursed, at least in France, are artificially fed more often than those brought up by their mothers. In 1907 of 90,000 children sent out to be nursed in France, only 25,000 were naturally fed; these furnished 1,850 deaths out of a total number of death of 7,950 in the first year of life; while in Paris, in the five years between 1905 and 1909, out of all the children expiring under one year, 10,780 had been naturally fed and 14,684 fed in other ways. Moreover, children sent out to be nursed are relatively less well looked after and therefore more likely to die, quite apart from the system of feeding, than those brought up at home. For this reason alone we should expect to find mortality higher amongst the artificially fed.

The influence due to these circumstances is to some extent taken into account in the works of Methorst and Huber. (W. Methorst. *Mortalitè et morbidité des nourissons á le Haye nés en* 1908, *en rapport avec la maniére de les nourrir et les circonstances sociales*. Bull. de l'Institut de Statistique. XIII. Session, 1911, Rapport N. 21; M. Huber. *Mortalitè suivant la mode d'allaitement des enfants placés en nourrice en France*. Ibidem, Rapport, N. 17.

The last-named compared the mortality of those naturally fed with that of those artificially fed in the case of children sent away to be nursed; the former classed the children not only according to method of nourishment but also according to the way they were looked after (well, indifferently, and badly). But no one has yet attempted to take into account, nor is anyone likely to be able to take into account, completely all the perturbing influences.

(16)—Hrdlicka, in his physiological and medical observations among the Indians of South-Western United States and Northern Mexico, amongst

whom natural feeding is carried on as long as possible, usually until a new delivery takes place, has established in 21 cases the interval between the delivery and the reappearance of menstrual discharges, and for 18 other cases the interval during which menstruation had not yet reappeared.

Out of these 39 cases, once only menstruation reappeared three months after delivery, and this happened to be an exceptional case, because the child had not been fed by the mother. See ALES HRDLICKA. *Physiological and Medical Observations among the Indians of South-Western United States and Northern Mexico.* Smithsonian Institution. Bureau of American Ethnology. Bulletin 34, Washington Government printing office, 1908. P. 64 and foll:

ED.—A further section of this paper reached us eight days only before publication, it will appear in the Supplement containing reports of discussions and proceedings to be published after the Congress.

MATERNITY STATISTICS OF THE STATE OF RHODE ISLAND, STATE CENSUS OF 1905.

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Statistician of the Prudential Insurance Company of America.

As a contribution to the practical study of eugenics the decennial maternity statistics of the State of Rhode Island are of exceptional interest and importance. Corresponding information, unfortunately, is not available for any other American State nor for the nation at large. For 1875 and 1885 important social statistics were published in connection with the census of Massachusetts, but although the utility of the data could not be questioned the publication of the statistics has been discontinued.

In 1905 the number of married females of all nationalities in the State of Rhode Island was 69,736, of whom 36,776, or 52.7%, were native-born; and 32,960, or 47.3%, were foreign-born. Of the native-born married women 26,329, or 71.6%, were mothers, and 10,447, or 28.4%, were ascertained to be childless. Considering only the married women born in Rhode Island, numbering 21,328, it was ascertained that of this number 15,257, or 28.5%, were childless, or about the same proportion as for all native-born married women considered as a group.

Of the foreign-born married women in the State of Rhode Island, 27,207, or 82.5% of the total number of married females, were mothers, and 5,753. or 17.5%, were childless. Contrasting this percentage of 17.5 with the corresponding percentage of 28.4 for native-born married women, the fact requires only to be stated to emphasize its profound and far-reaching social as well as political significance.

The average number of children to all married women in the State of Rhode Island was 2.66; for the native-born the average was 2.06; and for the foreign-born it was 3.35

Considered in detail by nativities, it is shown that the average number of children to the total number of married women in Rhode Island of French-Canadian parentage was 4.42; of Russian parentage, 3.51; of Italian parentage, 3.49; of Irish parentage, 3.45; of Scotch and Welsh parentage, 3.09; of English parentage, 2.89; of German parentage, 2.84; of Swedish parentage, 2.58; of English-Canadian parentage, 2.56; and of Polish parentage, 2.31; in contrast to an average of only 2.06 for native-born married women.

Compared with the state census of 1885, the average number of children of native-born mothers has decreased from 3.49 to 2.88, or 17.5%. The average number of children of foreign-born parents has decreased from 5.38 to 4.06, or 24.5%. The average number of children of parents of all nationalities has decreased from 4.72 during the 20-year period to 3.48, or 26.3%.

Compared with the State Census of 1885 the average number of children to native-born married women has decreased from 2.81 to 2.06 or 26.7%. The average number of children of foreign-born married women has decreased from 4.69 to 3.35 or 28.6%. The average number of children of married women of all nationalities has decreased from 3.54 to 2.67, or 24.6%.

In 1885 a number of mothers were found in Rhode Island with families of from nineteen to twenty-four children each, while in 1905 no mothers were enumerated by the census who had more than eighteen children each.

During the past twenty years the number of native-born mothers without children has increased 9.8%, whereas the number of foreign-born childless mothers increased only 4.7%.

Considering the proportion of childless women by nativity, it was ascertained by the census for 1905 that of the English-Canadian wives 24.2% were without children, whereas for the French-Canadian wives the proportion was 14.8%; for English wives, 18.5%; for German wives, 17.6%; for Irish wives, 17.5%; for Italian wives, 16.5%; for Polish wives, 21.6%; for Russian wives, 12.0%; and for Scotch and Welsh wives, 17.1%. Of course, to a certain extent, these results are affected by the age distribution of the population, and it is well-known that most of the nativities from South-eastern Europe represent chiefly immigrants of the child-bearing period.

Of the total number of children born to native-born mothers 79.5% were living at the time of the census enumeration, whereas for foreign-born mothers the corresponding percentage was 75.7. Comparing 1885 with

1905, it is shown that twenty years ago, of all the children born to native-born mothers 70.8% were living, against 79.5% in 1905. In contrast, for the foreign-born element the percentage of living children increased from 64.9 in 1885 to 75.7 in 1905. The true significance of these results cannot be determined without a complete analysis of the facts with a due regard to the age distribution of the population and the duration of married life.

Considered with reference to religious belief, it is shown by the census that of 33,727 married Protestants of all nationalities, 24,514, or 72.7%, were mothers, and of this number 9,213, or 27.3%, were childless. Of 34,160 Roman Catholic married women of all nationalities, 27,438, or 80.3%, were mothers, and 6,722, or 19.7%, were without children.

The number of married women of the Jewish faith of all nationalities was rather small, but apparently the facts are quite conclusive. Out of 1,623 married women of the Jewish faith, 1,428, or 88.0%, were mothers, and only 195, or 12.0%, were childless. Extending this analysis to the native-born and foreign-born, it is shown that of the native-born married Protestant mothers 30.7% were childless; whereas of the foreign-born Protestant mothers only 19.4% were childless; of the native-born Roman Catholic mothers 24.2% were childless; whereas of the foreign-born Roman Catholic mothers only 16.9% were without children. Of the native-born mothers of the Jewish faith 18.9% were childless; whereas for the foreign-born Jewish mothers only 11.4% were without children.

Since the relative fecundity is largely conditioned by age, I give, attached hereto, in Table I., the maternity statistics by divisional periods of life, showing the numbers and percentages of native and foreign-born women without children. According to this table, at ages 15-24 the percentage of native-born married women without children was 42.7, and of foreign-born married women, 33.2. The difference becomes more pronounced with increasing age, and at ages 25-34 the respective percentages are 29.0 for native-born married women, and 17.0 for the foreign-born; whereas at ages 35-45 the percentage of childless women for the native-born group is 22.9, against only 12.2 for the foreign-born.

In Table II., the number of mothers, according to the size of the family, is shown for the age period 15-45, amplified in more detail in Table III., which gives the data by divisional periods of life, or respectively, ages 15-24, 25-34, and 35-45. At ages 15-24, 60.3% of the native-born mothers had only one child, against 53.4% for the foreign-born; but only 0.6% of the native-born mothers had from six to ten children, against 0.9% for the foreign-born. At ages 25-34, the proportion of native-born mothers having only one child was 35.1%, against 22.6% for the foreign-born; the proportion of mothers having from six to ten children was 6.8% for the native-born, against 12.9 for the foreign-born. At ages 35-45, the proportion of native-born women having only one child was 23.3%, against 10.9% for the foreign-born; but the respective proportion of mothers having six to ten

children was 17.9 for the native-born, against 34.2% for the foreign-born. The proportion of native-born mothers having eleven children and over was only 1.9%, against 7.0% for the foreign-born. The actual and relative figures are extremely suggestive, and are given in sufficient detail in the three tables referred to; but the complete statistics for each year of life are given in Tables IV. and V., which are self-explanatory and require no discussion.

It needs no argument to prove the practical utility of statistical inquiries of this kind. Vastly more important than the multitude of general social and economic facts are these statistics of what, for want of a better term, may be called *human production*, and which disclose what must needs be considered the most alarming tendency in American life. Granting that excessively large families are not desirable, at least from an economic point of view, it cannot be questioned that the diminution in the average size of the family, and the increase in the proportion of childless families among the native-born of native stock, is evidence of physical deterioration, and must have a lasting and injurious effect on national life and character.

TABLE I.

Maternity Statistics of Rhode Island, 1905*: Number and Proportion of Married Women without Children.

Ages.	Total Married.	No. of Children.	Per Cent. Childless.
	Native and Foreign-Born.		
15-24	9,567	3,781	39·5
25-34	28,976	6,942	24·0
35-45	31,193	5,477	17·6
All ages	69,736	16,200	23·2
	Native-born.		
15-24	5,331	2,277	42·7
25-34	15,798	4,589	29·0
35-45	15,647	3,581	22·9
All ages	36,776	10,447	28·4
	Foreign-born.		
15-24	5,505	1,829	33·2
25-34	11,909	2,028	17·0
35-45	15,546	1,896	12·2
All ages	32,960	5,753	17·5

* Extracted from the Twenty-first Report of the Commissioner of Industrial Statistics for the State of Rhode Island. Providence, 1908.

TABLE II.

Maternity Statistics of Rhode Island, 1905: Number and Proportion of Mothers according to Size of Family (ages 15-45).

No. of Children.	Native and Foreign-born.		Native-born.		Foreign-born.	
Mothers of	No.	%	No.	%	No.	%
1	13,987	26·1	8,591	32·6	5,396	19·8
2-5	29,261	54·6	14,554	55·3	14,707	54·1
6-10	9,022	16·9	2,934	11·1	6,088	22·4
11-over	1,266	2·4	250	1·0	1,016	3·7
Grand total ...	53,536	100·0	26·329	100·0	27,207	100·0

TABLE III.

Maternity Statistics of Rhode Island, 1905: Number and Proportion of Mothers according to Size of Family, by Divisional Periods of Life.

Ages 15-24.

No. of Children.	Native and Foreign-born.		Native-born.		Foreign-born.	
Mothers of	No.	%	No.	%	No.	%
1	3,299	57·0	1,841	60·3	1,458	53·4
2-5	2,441	42·2	1,194	39·1	1,247	45·6
6-10	43	0·7	18	0·6	25	0·9
11-over	3	0·1	1	0·0	2	0.1
Total ...	5,786	100·0	3,054	100·0	2,732	100·0

Ages 25-34.

1	6,382	29·0	3,935	35·1	2,447	22·6
2-5	13,422	60·9	6,495	57·9	6,927	64·0
6-10	2,157	9·8	759	6·8	1,398	12·9
11-over	73	0·3	20	0·2	53	0·5
Total ...	22,034	100·0	11,209	100·0	10,825	100·0

Ages 35-45.

1	4,306	16·7	2,815	23·3	1,491	10·9
2-5	13,398	52·1	6,865	56·9	6,533	47·9
6-10	6,822	26·5	2,157	17·9	4,665	34·2
11-over	1,190	4·6	229	1·9	961	7·0
Total ...	25,716	100·0	12·066	100·0	13,650	100·0

IV.

Native and Foreign-Born Married Females, 15 to 45 Years of Age, inclusive, for Rhode Island, Classified by Number of Children.

By Ages.

Mothers of ...	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	Total.
1 Child	1	7	42	124	246	409	476	600	690	704	766	755	695	733	632	784	479	584	499	455	536	448	370	474	340	492	246	364	302	306	428	13,987
2 Children	...	...	4	28	59	144	194	314	411	447	543	535	545	628	541	693	473	580	467	492	570	464	408	490	359	445	259	387	298	314	395	11,487
3 ,,	...	...	1	2	6	31	53	98	147	233	282	350	371	394	367	550	360	430	379	409	447	338	335	412	312	408	207	315	246	238	303	8,024
4 ,,	...	...	...	...	1	11	12	26	58	96	143	145	202	252	239	341	227	347	275	275	317	295	271	330	255	352	166	288	217	192	272	5,605
5 ,,	...	...	...	...	1	2	1	8	17	36	58	78	88	130	152	228	154	254	209	236	302	219	233	275	231	281	157	208	179	172	236	4,145
6 ,,	...	...	...	...	1	1	1	4	6	11	26	27	35	81	84	163	107	156	168	198	229	185	193	244	178	245	121	196	140	153	184	3,137
7 ,,	...	...	...	...	1	...	...	4	2	3	13	10	24	33	42	73	43	102	116	102	158	158	147	199	152	204	109	149	138	144	168	2,294
8 ,,	...	...	...	...	...	1	...	...	1	2	3	6	6	11	17	31	29	61	68	83	104	98	91	157	123	172	105	125	107	95	146	1,642
9 ,,	...	...	...	...	...	...	...	...	1	2	1	4	4	5	7	16	17	22	38	41	57	70	78	84	78	108	74	110	91	92	114	1,114
10 ,,	...	...	...	...	...	1	...	1	...	...	1	...	1	2	4	5	9	12	18	32	35	40	53	69	59	99	76	78	66	84	90	835
11 ,,	...	...	...	...	...	...	...	...	1	...	...	...	1	1	...	3	1	5	15	3	19	26	28	40	37	46	31	48	43	44	58	450
12 ,,	...	...	...	...	...	...	...	...	...	...	1	...	...	1	...	4	2	3	8	8	8	11	21	27	35	59	29	31	42	42	42	374
13 ,,	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	2	...	4	4	4	7	11	16	31	14	18	23	23	32	190
14 ,,	...	...	...	...	...	...	...	...	...	...	...	...	2	...	...	...	1	2	...	1	...	1	4	8	9	14	8	9	15	18	19	111
15 ,,	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	2	...	...	...	1	1	1	2	2	6	11	3	9	11	10	6	66
16 ,,	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	1	...	...	2	1	1	1	1	3	10	3	4	3	31
17 ,,	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	3	4	2	1	4	2	4	22
18 Children and over	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	1	3	3	1	3	3	6	22
Total Mothers	1	7	47	154	315	600	737	1056	1334	1535	1837	1910	1974	2271	2085	2893	1903	2560	2261	2340	2787	2360	2242	2827	2195	2975	1613	2347	1928	1936	2506	53,536
Childless	16	53	109	229	316	471	507	688	659	733	897	734	718	773	680	854	466	708	531	581	705	486	474	610	456	779	311	419	371	346	520	16,200
Total Married	17	60	156	383	631	1071	1244	1744	1993	2268	2734	2644	2692	3044	2765	3747	2369	3268	2792	2921	3492	2846	2716	3437	2651	3754	1924	2766	2299	2282	3026	69,736
Per cent. Childless	94·1	88·3	69·9	59·8	50·1	44·0	40·8	39·4	33·1	32·3	32·8	27·8	26·7	25·4	24·6	22·8	19·7	21·7	19·0	19·9	20·2	17·1	17·5	17·7	17·2	20·8	16·2	15·1	16·1	15·2	17·2	23·2

V

NATIVE-BORN MARRIED FEMALES, 15 TO 45 YEARS OF AGE, INCLUSIVE, FOR RHODE ISLAND, CLASSIFIED BY NUMBER OF CHILDREN. BY AGES.

Mothers of	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	Total.
1 Child	1	5	28	79	142	216	259	315	400	396	413	456	422	433	401	473	341	382	330	284	339	314	248	301	213	305	163	232	202	207	291	8,591
2 Children	...	...	4	19	29	75	118	148	196	210	269	266	267	326	306	365	299	333	289	293	330	280	242	290	224	234	159	236	200	190	267	6,464
3 ,, ...	...	...	1	2	2	20	32	46	66	115	119	158	173	184	167	251	201	212	179	226	223	161	180	192	184	201	115	157	147	139	151	4,004
4 ,, ...	...	...	...	...	...	5	3	9	25	41	56	54	62	92	103	127	110	156	116	132	145	111	124	143	104	149	97	142	109	100	124	2,439
5 ,, ...	...	...	...	...	...	...	1	5	10	12	18	37	34	54	62	66	68	93	84	88	96	94	84	110	108	100	62	91	75	83	112	1,647
6 ,, ...	...	...	...	...	...	...	1	1	3	3	10	8	15	26	32	66	43	68	48	72	76	57	66	87	60	69	47	71	65	66	70	1,130
7 ,, ...	...	...	...	...	1	...	...	2	1	1	5	2	9	8	19	24	15	35	49	48	63	44	42	57	55	56	40	50	48	57	68	799
8 ,, ...	...	...	...	...	...	1	...	...	...	1	...	1	1	2	7	9	9	20	20	22	21	40	23	48	43	31	30	33	41	24	40	467
9 ,, ...	...	...	...	...	...	...	...	...	...	1	1	...	1	1	1	4	3	6	8	12	16	15	22	21	16	20	21	35	25	28	34	291
10 ,, ...	...	...	...	...	...	1	...	1	...	...	1	...	...	1	1	3	3	1	7	12	9	16	11	23	13	26	17	23	18	31	29	247
11 ,, ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	6	1	1	3	2	11	13	8	5	16	9	10	9	96
12 ,, ...	...	...	...	...	...	...	...	...	...	...	1	...	...	1	...	...	...	2	2	...	2	3	4	7	9	12	7	1	12	9	11	83
13 ,, ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	...	2	4	2	2	6	2	4	2	5	3	34
14 ,, ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	1	...	...	...	1	2	2	...	2	2	1	2	14
15 ,, ...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	1	...	...	...	...	1	...	1	1	...	1	...	1	1	1	1	10
16 ,, ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	1	...	...	...	...	...	...	1	...	3
1 ,, ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	...	2	...	...	1	...	1	6
18 Children and over	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	1	...	...	1	1	...	...	4
Total Mothers ...	1	5	33	100	174	318	414	528	701	780	893	982	984	1128	1099	1389	1093	1310	1138	1193	1322	1141	1054	1297	1047	1222	765	1095	958	952	1213	26,329
Childless	11	32	71	131	178	242	328	421	417	446	572	469	485	506	433	570	329	487	353	385	456	324	331	402	300	469	198	277	255	225	344	10,447
Total Married ...	12	37	104	231	352	560	742	949	1118	1226	1465	1451	1469	1634	1532	1959	1422	1797	1491	1578	1778	1465	1385	1699	1347	1691	963	1372	1213	1177	1557	36,776
Per cent. Childless	91·7	86·5	68·3	56·7	50·6	43·2	44·2	44·4	37·3	36·4	39·0	32·3	33·0	31·0	28·3	29·1	23·1	27·1	23·7	24·4	25·6	22·1	23·9	23·7	22·3	27·7	20·6	20·2	21·0	19·1	22·1	28·4

Section IV.

Medicine and Eugenics.

SUR LA PROPHYLAXIE DE LA SYPHILIS HÉRÉDITAIRE ET SON ACTION EUGÉNIQUE.

Par DR. H. HALLOPEAU,

Professeur agrégé à la Faculté de Médecine, Paris.

La syphilis doit être considérée comme une cause puissante de malformations congénitales et, si le néologisme *eugénique* prend place définitivement dans le langage international, on pourra lui opposer celui de *dysgénique* pour la qualifier.

Il est de toute évidence que cette maladie a, depuis qu'elle existe jusqu'à ces derniers temps, contribué puissamment à la genèse de nombreux enfants mal venus : chacun connaît le type de *l'hérédo-syphilitique* caractérisé par les *altérations crâniennes*, les *dystrophies dentaires* et les *troubles auditifs*, cette triade dont la découverte a concouru à illustrer le nom d'Hutchinson ; il faut y ajouter le *retard et le trouble du développement ainsi que son insuffisance*, les *difformités nasales*, les *altérations osseuses et articulaires*, l'*infantilisme* et tout l'ensemble de tares qu'ont si bien décrites le Professeur Alfred Fournier et Edmond Fournier.

En prévenant la syphilis héréditaire, le médecin contribue donc efficacement à l'*Eugénique*. Comment y parvenir?

Il appartient, en premier lieu, à l'Etat de prendre toutes les mesures possibles, particulièrement la multiplication des consultations gratuites et l'internement hospitalier des prostituées atteintes de lésions susceptibles de donner lieu à des contaminations, pour éviter la propagation publique de la maladie : c'est ce que l'on peut appeler la *prophylaxie administrative*.

On doit également faire intervenir la *prophylaxie par persuasion* : il faut montrer aux syphilitiques qu'ils n'ont pas le droit de procréer, aussi longtemps qu'ils sont susceptibles de transmettre leur infection à leur progéniture. Combien de fois le médecin est appelé à user, en pareille matière, de sa légitime influence et à jouer ainsi un rôle social d'une importance capitale : au jeune homme qui vient lui dire, comme à un confesseur, " Je dois très prochainement contracter un mariage qui ne peut être reculé, et je suis syphilitique depuis peu de temps : que dois je faire? " qu'il réponde, " Abstenez vous, jusqu'à nouvel ordre, de tout rapport fécondant, tout en prenant les précautions nécessaires pour ne pas infecter votre femme, et soignez vous énergiquement."

Il y a lieu enfin de pratiquer la *prophylaxie médicale* en annihilant la maladie chez ceux qui en sont atteints.

CAS DE SYPHILIS TRAITÉS PAR LA METHODE ABORTIVE LOCALE.

SUCCES.

Nos	NOMS	DÉBUT DU CHANCRE	TRAITEMENT	ACCIDENTS SECONDAIRES	RÉACTION DE WASSERMANN	AGE de la Maladie
1	I. G.	1er novembre 1908	40 injections locales d'atoxyl, 20 injections fessières de benzoate d'hydr. 1 gr. d'iodure.	Nuls	Positive pendant 1 an, disparaît sans traitement le 1er mars 1912	44 mois
2	Lucien	4 juin 1909	Injections locales, successivement d'atoxyl, d'hectine et de 0.10 cgr. d'arsacétine. —20 injections fessières de benzoate d'hydr.	id.	Négative	37 mois
3	Octave L.	13 juin 1909	Injections locales, successivement d'atoxyl et d'hectine et 20 injections fessières de benzoate d'hydr.	Nuls. En juin 1911, nouveau chancre induré.	id.	37 mois
4	G. Faend.	18 septembre 1909	30 injections locales d'hectine en alternant avec l'arsacétine.	Nuls	Positive pendant 4 mois, disparaît ultérieurement.	33 mois
5	Gr.	3 novembre 1909	Injections locales pendant 35 jours, d'abord d'arsacétine, puis d'hectine. — 30 injections fessières de benzoate d'hydr. Iodure.	id.	Négative	31 mois
6	A. Gr.	28 février 1910	30 injections locales d'hectine, 20 injections fessières de benzoate d'hydr. Iodure.	id.	id.	28 mois
7	R. T.	22 juin 1910	id.	id.	id.	28 mois
8	Henn.	3 mai 1910	id.	id.	id.	26 mois
9	H. Gin.	1er juin 1910	id.	id.	id.	28 mois
10	D. F.	22 juin 1910	id.	id.	Négative le 15 janv. 1912.	24 mois ½
11	H. R.	18 juillet 1910	id.	id.	Positive, puis négative.	26 mois

12	G. B.	13 juillet 1910	id.	id.	Négative	24 mois
13	Henn.	29 juillet 1910	id.	id.	id.	24 mois
14	Asq.	8 août 1910	id.	id.	id.	23 mois
15	A. Ro.	22 juillet 1910	18 injections locales d'hectine.	id.	id.	23 mois
16	B.	28 août 1910	30 injections locales d'hectine.	id.	id.	23 mois
17	X., de St-Mihiel.	1er août 1910	id.	id.	id.	23 mois
18	W.	2 octobre 1910	id.	id.	id.	24 mois
19	S.	15 octobre 1910	id.	id.	id.	24 mois
20	B.	28 août 1910	id.	id.	id.	23 mois
21	C.	1er septembre 1910	id.	id.	id.	22 mois
22	Delb.	18 novembre 1910	35 injections locales d'hectine.	id.	id.	20 mois
23	H. Gr.	27 février 1910	30 injections locales d'hectine.	id.	id.	17 mois
24	Mom.	7 janvier 1911	30 inject. d'hectine à 0,20, pilules de sublimé.	id.	Positive à 2 reprises, puis négative.	18 mois
25	Can.	2 chancres en décembre 1910	30 inject. d'hectine à 0,20	id.	Négative	19 mois
26	Fernand D.	25 novembre 1910	id.	id.	id.	19 mois
27	Robert L.	12 décembre 1910	id.	id.	id.	19 mois
28	Leb.	15 février 1911	id.	Nuls—femme accouchée le 3 août d'un enfant sain.	id.	17 mois
29	Gl.	25 février 1911	id.	Nuls	id.	13 mois
30	Trep.	4 avril 1911	id.	id.	id.	19 mois
31	Al. (St-Maixent)	1er novembre 1910	id.	id.	id.	20 mois
32	X. (Nanterre)	mars 1911	17 injections.	id.	id.	14 mois
33	Md.	9 juillet 1911	30 injections.	id.	id.	12 mois

INSUCCÈS.

1	Gerl.	25 février 1911	30 injections d'hectine à 0,20.	Une plaque muqueuse labiale.	Positive le 5 mai.	17 mois
2	Lus.	25 décembre 1910	id.	Syphilide papuleuse le 24 mai.	D'abord négative, puis positive.	19 mois
3	Facteur	17 novembre 1910	id.	Plaques muqueuses buccales le 1er juin.	D'abord négative, puis positive le 5 mai.	19 mois ½
4	Lecl.	2 avril 1911	id.	Plaques buccales en août.	Négative en juin.	19 mois
5	Boucher	29 juillet 1910	id.	Roséole le 4 mai 1911.	Négative.	23 mois
6	Moham.	9 juin 1911	id.	Roséole	id.	13 mois

La conduite qu'il convient de tenir à cet égard est différente suivant que la syphilis est à sa période *primaire* ou qu'elle est *généralisée*.

A la période *primaire*, on doit mettre en œuvre le *traitement abortif local*, tel que nous l'avons formulé à diverses reprises, et tout récemment au Congrès dermatologique et syphiligraphique international de Rome. Il consiste essentiellement en des injections locales suffisamment multipliées d'un agent spécifique bien toléré. On en a nié l'efficacité sous prétexte que la maladie serait généralisée dès l'apparition du chancre ; on se basait sur les insuccès de l'ablation de la lésion initiale, alors même qu'elle a été pratiquée dès les premières heures de son développement ; or, nous avons montré que cette argumentation spécieuse portait à faux : c'est à tort que l'on a limité au chancre l'infection initiale ; nous avons établi, en 1911, dans une communication à l'Institut de France (Académie des Sciences), qu'il *y a toute une région d'invasion primaire* qui s'étend tout autour de la lésion apparente jusqu'aux ganglions satellites ; l'ablation de cette région, dans son ensemble, est impraticable, mais il résulte de nos observations cliniques que l'on peut y annihiler le virus par des injections locales d'un produit doué, à cet égard, d'une action spécifique ; les mercuriaux ne sont pas à employer dans ce but, en raison de la trop vive réaction qu'ils provoquent ; mais, on obtient au contraire les résultats les plus satisfaisants en ayant recours au *benzosulfonepara-aminophénylarsinate de soude*, découvert et dénommé *hectine* par M. Mouneyrat.

En renouvelant quotidiennement les injections de cette préparation pendant une quarantaine de jours, on détruit, pour ainsi dire, dans l'oeuf, l'agent infectieux, et le malade est définitivement guéri de sa syphilis : on peut lui permettre au bout d'un an une procréation qui sera *eugénique*. Les rares trèpomènes pâles qui ont pu concurremment pénétrer dans la circulation ont été détruits par la résorption du médicament ainsi introduit dans l'organisme.

Le tableau que nous avons l'honneur de présenter au Congrès met en relief le bien fondé de ces propositions : on y voit, en effet, que, *sur 39 syphilitiques traités par notre méthode dans la période primaire, 33 n'ont présenté, au bout d'un an ou plus, aucune trace d'accidents secondaires ;* il y a donc toutes chances pour qu'il n'y ait pas eu d'infection généralisée et pour que les malades soient définitivement débarrassés de leur redoutable ennemie, Il n'y a pas d'exemple que les signes de généralisation aient apparu plus tardivement.

On obtient des résultats analogues à ceux que nous venons d'exposer en pratiquant, dans une région quelconque, deux ou trois injections de salvarsan. Cependant la comparaison entre les deux médications est toute en faveur de celle par l'hectine. En effet, l'expérience démontre que la généralisation secondaire est notablement plus fréquente après les injections de salvarsan, et, d'autre part, celles-ci sont loin d'être constamment inoffensives. Nous avons fait connaître à l'Académie de Médecine un fait dans lequel elles

ont déterminé, en 48 heures la mort d'un homme encore jeune et en pleine santé; plusieurs cas semblables ont depuis lors été signalés, notamment par le Dr. Gaucher. Restant fidèle à l'axiome: "*Primo non nocere*," nous nous déclarons catégoriquement l'adversaire d'une pratique qui peut entraîner de tels accidents.

Dans les cas où la syphilis est généralisée, le problème est plus difficile. On a cependant encore de bonnes chances d'enrayer définitivement l'évolution de la maladie si l'on met en usage simultanément les injections de salvarsan, de mercure et d'hectine, en un mot, si l'on fait flèche de tout bois. On pratiquera, à la suite de cette médication suractive, la recherche de la réaction de Wassermann, et, si elle donne, à plusieurs reprises et à intervalles suffisamment éloignés, des résultats négatifs, on pourra permettre la procréation avec toutes probabilités en faveur de *l'eugénique*.

Nous n'avons pas besoin de faire ressortir l'importance de ces données: *en supprimant la syphilis héréditaire, on annihile, par cela même, toutes les malformations héréditaires que nous avons énumérées: on contribue ainsi puissamment à l'eugénique.*

ON THE PROPHYLAXIS OF HEREDITARY SYPHILIS, AND ITS EFFECT ON EUGENICS.

By Dr. H. Hallopeau,

Professor to the Faculty of Medicine, Paris.

This malady must be ranked as a potent cause of congenital malformations, and if the modern term "eugenic" is to take a permanent place in the international vocabulary, the opposite term "dysgenic" might well describe this disease.

All our evidence goes to show that syphilis has, from its earliest advent up to the present time, been a powerful factor in the birth of diseased infants. Everybody knows the "heredo-syphilitic" type, characterised by cranial changes, dental dystrophies and auditive mischief—the triad whose discovery has made the name Hutchinson famous: add to this the retardation as well as the stunting of development, nasal deformities, osseous and articular changes, infantilism, and all the combination of ills so well described by Prof. Alf. Fournier and Dr. Edmond Fournier.

Therefore in preventing hereditary syphilis, medicine makes a powerful contribution to eugenics. How can it compass this end?

First, it is the business of the State to take all possible measures to avoid the open propagation of this disease; this is what we may call "prophylaxis by the police."

Secondly, similar use may be made of "prophylaxis by persuasion"; we must show syphilitics that they have not the right to become parents so long as they are liable to transmit their disease to their offspring.

SUCCESSES.

Nos.	Names.	Appearance of Chancre.	Treatment.	Secondaries.	Wasserman re-action.	Duration Months.
1	L. G....	Nov. 1, 1908	40 local inj. Atoxyl., 20 Buttock inj. Merc. Benzoate. 1 gr. Iodide.	None	+ for a year, disappeared 1 March, 1912, without treatment.	44
2	Lucien	June 4, 1909	Successive local inj. of Atoxyl., Hectine and 1 mgr. Arsacetine, 20 Buttock injs. of Hg. Benz.	,,	Neg.	37
3	Octave L....	June 13, 1909	Atoxyl., Hectine and Buttock inj. Hg. Benz.	Fresh Chancre, June, 1911	,,	37
4	G. Faende	Sept. 18, 1909	30 local inj. Hectine alternately with Arsacetin.	None	+ 4 months, Neg. later.	33
5	Gr.	Nov. 3, 1909	35 days inj. Arsacetin and Hectine, 30 Buttock inj. Hg. Benz. and Iodide.	,,	Neg.	31
6	A. Gr.	Feb. 28, 1910	30 local inj. Hectine, 20 Buttock inj. Hg. Benz.	,,	,,	28
7	R. T.	June 22, 1910	do.	,,	,,	28
8	Henn.	May 3, 1910	do.	,,	,,	26
9	H. Ginn	June 1, 1910	do.	,,	,,	28
10	D. F....	June 22, 1910	do.	,,	Neg. 15 Jan., 1902.	24
11	H. R.	July 18, 1910	do.	,,	+ then Neg.	26
12	G. B....	July 13, 1910	do.	,,	Neg.	24
13	Henn.	July 29, 1910	do.	,,	,,	24
14	Asq.	Aug. 8, 1910	do.	,,	,,	23
15	A. Ro.	July 22, 1910	18 local inj. Hectine.	,,	,,	23
16	B.	Aug. 28, 1910	30 ,, ,,	,,	,,	23
17	X, de St. Mihiel ...	Aug. 1, 1910	do.	,,	,,	23
18	W.	Oct. 2, 1910	do.	,,	,,	24
19	S.	Oct. 15, 1910	do.	,,	,,	24
20	B.	Aug. 28, 1910	do.	,,	,,	23
21	C.	Sept. 1, 1910	do.	,,	,,	22
22	Delb.	Nov. 18, 1910	35 inj. Hectine	,,	,,	20
23	H. Gr.	Feb. 27, 1910	30 ,,	,,	,,	17
24	Monn.	Jan. 7, 1911	30 inj. Hectine and pills of Subl.	,,	Twice + then —	18

Successes — *Continued.*

Nos.	Names.	Appearance of Chancre.	Treatment.	Secondaries.	Wassermann re-action.	Duration Months.
25	Can.	Dec., 1910 (2 ch.)	30 inj. Hectine and pills of Subl.	None	Neg.	19
26	Fernand D.	Nov. 25, 1910	do.	,,	,,	19
27	Robert L.	Dec. 12, 1910	do.	,,	,,	19
28	Leb.	Feb. 15, 1911	do.	3 Aug. had a healthy child.	,,	17
29	Gl.	Feb. 25, 1911	do.	None	,,	13
30	Trep....	April 4, 1911	do.	,,	,,	19
31	Al. (St. Maixent) ...	Nov. 1, 1910	do.	,,	,,	20
32	X. (Nanterre)	Mar., 1911	17 inj. Hectine.	,,	,,	14
33	Md.	July 9, 1911	30 ,,	,,	,,	12

Failures.

1	Gerl.	Feb. 25, 1911	30 inj. Hectine with pills of Subl.	Mucous Plaque on lip.	+ May 5.	17
2	Lus.	Dec. 25, 1910	do.	Papular Syphilide, May 24.	First — then +	19
3	Facteur	Nov. 17, 1910	do.	Mucous Plaques on mouth, June 1.	First — then +	19
4	Lecl.	April 2, 1911	do.	Buccal Plaques, Aug.	Neg. in June.	19
5	Boucher	July 29, 1910	do.	Roseola, May 4, 1911.	Neg.	23
6	Moham	June 9, 1911	do.	Roseola.	,,	13

Thirdly, there is room for the practise of "medical prophylaxis" in eradicating the disease from the persons affected by it. In this last, the procedure which must be adopted is different according as the disease is in its primary condition (local) or generalised.

In the primary period, we must get to work with local abortive treatment, such as we have several times sketched, specially a short time ago at the Dermatological and Syphilographic Congress at Rome. The possibility of doing this has been denied on the ground that the disease must be generalised from the time of appearance of the chancre; this is based on the failure to cure by removal of the chancre even in the early hours of its development. I showed, however, that this specious argument missed the point; it is a mistake to limit the initial infection to the chancre. I established that there is a whole region of primary infection, which extends all round the apparent lesion as far as the corresponding glands; the removal of this entire region is impracticable, but we have demonstrated by our clinical observations that we can clear out the virus by local injections of a product endowed with a specific action; this action cannot be utilised on persons already under mercury, because in their case the reaction is too violent; but in other cases most satisfactory results are obtained by recourse to benzosulpho-paraaminophenylarsenate of soda, discovered by M. Mouneyrat, and named by him "hectine."

By repeating daily injections of this preparation over a period of forty days, one destroys, so to speak, in embryo, the infectious agent, and the patient is definitively cured of his syphilis; at the end of a year he can be assured of a "eugenic" progeny.

The table which we have the honour to present to the Congress illustrates the soundness of our contention; there it may be seen that of 39 syphilitics, treated by our method in the primary stage, 33 have, at the end of a year or more, shown no traces of secondary mischief; so that there is every probability that they are definitely rid of their terrible enemy.

Results similar to those we have just shown are obtained by making, in a given region, two or three injections of salvarsan. However, the comparison between the two medications is altogether in favour of that by hectine. Indeed, experience proves that the secondary generalization is noticeably more frequent after injections of salvarsan, and, besides, these are far from being always painless. We have made known to the Académie of Medicine a case in which, within 48 hours, they caused the death of a young man in good health. Several similar cases have since been notified, particularly by Dr. Gaucher. Confidently believing in the axiom "Primo non nocere," we explicitly declare ourselves adversaries of a practice which brings such accidents in its train.

In cases where the disease is generalised, the problem is more difficult. Nevertheless, there is still a good chance of definitely checking the disease if we use at the same time injections of salvarsan, mercury, and hectine—

employing, in a word, all the weapons at our command. In the wake of such active medication, we must examine by means of the Wassermann reaction, and if it gives negative results with sufficient frequency at long enough intervals, one can then permit parenthood with all chances in favour of a "Eugenic" result.

There is no need to emphasize further the importance of our thesis: In suppressing hereditary syphilis, we annihilate at the same time all the hereditary malformations which we have named; thus we give a powerful stimulus to Eugenics.

ALKOHOL UND EUGENIK.

Ein neuer Weg zur Bekämpfung des Alkoholismus.

By Dr. Alfred Mjoën.

Owing to the complete paper not being available for publication, an abstract only is included.

Der schädliche Einfluss des Alkohols hängt nicht allein von der Eingeführten Menge ab, sondern daneben noch von anderen Faktoren, wie z.B. von der Verdünnung und von der Art der begleitenden Nahrungsmittelaufnahme. Es besteht kein Zweifel, dass der Alkohol unter einem gewissen Prozentgehalt weder der Somazelle noch—was für die Rassenhygiene wichtiger ist—der Keimzelle mehr schadet oder schaden kann. Und umgekehrt muss als feststehend betrachtet werden, dass der Alkohol über einem gewissen Prozentgehalt der Qualität der Nachkommenschaft schadet, nicht allein wo die Mutter trinkt (Einwirkung auf d. Embryo) sondern auch wo der Vater allein ein Trinker ist (Keimverderbnis, antiregeneration). Die letzten Untersuchungen auf diesem Gebiete bestätigen diese Annahme.

Es giebt zwar eine mittlere Klasse von Getränken, deren Einwirkung auf das Keimplasma (Nachkommenschaft) nicht festgestellt worden ist, oder überhaupt festgestellt werden kann. Als allgemeine Tatsache darf man aber den Leitsatz aufstellen:

Die Schädlichkeit eines alkoholischen Getränkes für Individuum u. Rasse wächst von einem gewissen Prozentgehalt ab progressiv mit seinem steigenden Gehalt an Alkohol.

Ich stelle daher den Antrag, die alkoholischen Getränke in Klassen einzuteilen und sie nach dem Grade Ihres Alkoholgehalts, d. h. also nach dem Grad ihrer Schädlichkeit, zu behandeln. Alle in den Handel kommenden Gefässe, Flaschen u.s.w. sollen mit der Klassenmarke (z.B. I., II., III. auf den Kork eingebrannt) versehen sein.

Für Bier z.B. soll die erste Klasse (unter $2\frac{1}{4}\%$) überall zugängig sein. Für diese Klasse wird ausser einer Steuererleichterung auch eine Verkaufserleichterung und Bewilligungserleichterung gefordert. Klasse I. bis $2\frac{1}{4}\%$ wird mit 2 Ore belastet, Klasse II. ($2\frac{1}{4}$—$3\frac{3}{4}\%$) mit 8 Ore und Klasse III. ($3\frac{3}{4}$—5%) mit 15—16 Ore pro Liter. Bier über 5% oder $5\frac{1}{2}\%$ wird verboten.(1)

Das Klassensystem lässt eine einfache, billige und wirkungsvolle Kontrolle zu, und zwar eine Kontrolle, die nicht an die Brauerei oder an ein einzelnes Zubereitungsstadium gebunden ist, sondern der Waare von ihrem ersten Entstehen bis zu ihrer Konsumption über das ganze Land folgt. Wenn die Alkoholwaare mit ihrer Klasse bezeichnet und unter staatliche Kontrolle gesetzt ist, werden die Konsumenten die Kontrolle mit Leichtigkeit selber ausüben können. Und das Publikum wird nach und nach darin geübt werden, den Einfluss der verschiedenen Waaren auf die Arbeitskraft und die Gesundheit nicht allein des Individuums sondern auch der Familie, der Rasse, zu beurteilen. Stadt-und Landgemeinden werden bei staatlich kontrollierten Klassen leichter nach allen Seiten hin Gerechtigkeit walten lassen können. Dieser letztere Vorteil gilt natürlich nur in den Ländern, wo die Bewilligung zum Verkauf alkoholischer Getränke den örtlichen Behörden unterstellt ist. Das progressive Klassensystem wird ausserdem sowohl dem Staat wie den Kommunen und auch der privaten Organisationsarbeit Gelegenheit geben, solche Restaurants und Wirtschaften zu unterstützen, die nur unschuldige und unschädliche Trinkwaaren ausschenken, und der Verbrauch wird eine langsame und allmähliche Verschiebung hinüber zu den leichtesten Getränken erfahren.

Zur Zeit sind die leichtesten Biersorten zu stark besteuert im Verhältnis zu den stärksten Biersorten und diese wiederum zu stark im Verhältnis zum Branntwein besteuert. Vom rassenhygienischen Standpunkt aus muss sich der Kampf hauptsächlich gegen die vierte und gefährlichste Klasse richten, nämlich alle Sorten von Branntwein sowie gegen die oft stark verfälschten und heimtückischen Mischweine (Verbot oder Ivan Bratts-system).

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(1) Dieser Vorschlag wurde von dem norwegischen Ministerium Knudsen einstimmig angenomme und dem Storting als Regierungsvorlage vorgelegt. Der Vorschlag ist auf das Wahlprogramm der Radikalen, der Sozialdemokraten sowie sämmtlicher Abstinenzorganisationen aufgenommen.

THE EFFECT OF ALCOHOL ON THE GERM-PLASM.

(THE NEW ALCOHOL LEGISLATION IN NORWAY.)

By DR. ALFRED MJOËN.

The paper not being available for publication, an abstract of it is given.

The injurious effect of alcohol depends not only upon the amount taken, but also upon other factors, as, *e.g.*, upon its dilution, and upon the kind of nourishment taken with it. There can be no doubt that alcohol under a certain percentage neither injures nor can injure either the somatic cells, or what is more important for race-hygiene, the germ cells. And, on the other hand, it must be regarded as proved that alcohol over a certain percentage is injurious to the quality of the offspring, not alone where the mother drinks (influence upon the embryo), but also where the father alone is a drinker (destruction of the germ). The latest investigations in this field confirm this assumption.

There is, it is true, a middle class of beverages whose influence upon the germ-plasm (posterity) has not been established, or can be established at all. As a general rule, one may lay down the rule: *The injurious effect of an alcoholic beverage upon individuals or race increases from a certain percentage progressively with its increasing contents of alcohol.*

Therefore, I propose to divide alcoholic liquors into classes, and to deal with them according to the amount of their contents of alcohol, *i.e.*, according to their injuriousness.

All casks, bottles, etc., coming into the market are to be furnished with the class-mark (*e.g.*, I., II., III., branded upon the cord).

For example, in the case of beer, the first class (under $2\frac{1}{4}\%$), shall be obtainable everywhere. For this class there will be claimed, besides a reduction of duty, also a facility for sale and some concessions. Class I. (up to $2\frac{1}{4}\%$) will be charged with 2 ore; Class II. ($2\frac{1}{4}$—$3\frac{3}{4}\%$) with 8 ore; and Class III. ($3\frac{3}{4}$—5%) with 15-16 ore per litre. Beer over 5% or $5\frac{1}{2}\%$ will be prohibited(1).

The class system permits of a simple, cheap, and practicable control, and, indeed, a control which is not confined to the brewery or to any single stage of preparation, but which follows the article over the whole country from its origin to its consumption. When alcoholic drinks are marked with their class and placed under State control, the consumers will themselves easily exercise the control. And the public will gradually become accustomed to form an opinion upon the influence of the various articles upon the working capacity and the health, not only of the individual, but also of

(1) This proposal was favourably received by the Norwegian minister Knudsen, and brought before the Storthing as a Government measure. The proposal has been accepted as part of the election programme of the Radicals, the Socialist Democrats, and all total abstinence organisations.

the family and the race. State and country authorities will, with State-controlled classes, more easily see justice done on all sides. This last advantage will, naturally, only avail in those lands where the permission to sell alcoholic liquors is vested in the local authorities. The progressive class system will also give the State, the municipalities, and also private labour organisations an opportunity to support those restaurants and inns which supply nothing but pure and harmless liquors, and consumption will undergo a slow and gradual change to the lightest drinks.

At the present time the lightest kinds of beer are too heavily taxed in comparison with the heaviest kinds, and the latter in turn are too heavily taxed in comparison with brandy. From the point of view of race-hygiene, the fight must be directed especially against the fourth and most dangerous class, namely, all kinds of spirits (prohibition or Ivan Bratt's system), as well as against the mixed wines, which are so often adulterated and injurious.

ALCOOLISME ET DÉGÉNÉRESCENCE.

STATISTIQUES DU SERVICE CENTRAL D'ADMISSION DES ALIÉNÉS DE LA VILLE DE PARIS, ET DU DÉPARTEMENT DE LA SEINE DE 1867 à 1912.

Par MM. MAGNAN,

Médecin en Chef du Service Central d'Admission à l'Asile Ste. Anne, Membre de l'Académie de Médecine,

Et A. FILLASSIER,

Membre de la Société Clinique de Médecine Mentale, et de la Societié de Médecine de Paris.

Depuis 1867, tous les aliénés de Paris et du département de la Seine sont dirigés sur le Service Central d'Admission de l'Asile clinique Sainte Anne (Bureau d'Admission), où ils sont soumis, avant d'être transférés dans les différents asiles, à un examen plus ou moins prolongé.

Pour chacun d'eux, un dossier est établi ; il porte, outre le texte des certificats rédigés par le Médecin, les faits cliniques qu'il a retenus au cours de son observation, et les indications fournies par les parents ou les familiers du malade.

De tout ceci résulte un ensemble considérable de documents précieux. Il nous a semblé intéressant de les dépouiller, à l'occasion du " First International Eugénics Congress " et de tenter de dégager les enseignements

qu'ils renferment en se plaçant plus spécialement au point de vue des effets de l'alcool sur l'individu et sa descendance.

* * *

Une première question se pose—parmi les malheureux que la folie conduit à l'asile, combien y sont poussés par l'alcool?

La part de l'alcool est ici considérable, et depuis 1867 elle s'est toujours accrue. Bien mieux, l'alcool, dès qu'il est apparu, a modifié même l'aspect de nos asiles.

D'après les rapports de M. Husson, Directeur de l'Assistance Publique, de 1801 à 1840, les entrées par sexes, réunies par périodes de dix années, indiquent plus de femmes que d'hommes; de 1841 à 1863 il en est de même, sauf pour les trois années 1843, 1845 et 1859, où les hommes comptent quelques unités de plus.

1843	...	1335 entrées	668 hommes	667 femmes
1845	...	1227	618	609
1859	...	1923	977	946

On attribuait cette prédominance de la folie chez la femme à son tempérament plus nerveux, à sa sensibilité, à son émotivité plus grandes.

Mais à partir de 1863, le chiffre des entrées des hommes qui s'était peu à peu élevé, dépasse d'abord de quelques dizaines celui des femmes et rapidement, c'est par centaines que se traduit le surcroît des entrées des hommes.

Un nouvel élément est intervenu, l'alcool, qui, plus néfaste pour l'homme que pour la femme, empoisonne celui-ci, le rend fou, et le conduit à l'asile d'aliénés.

1863	...	2045 entrées	1046 hommes	999 femmes
1864	...	2083	1057	1026
1865	...	2248	1203	1045
1866	...	2445	1297	1148(1)

Du 1er mai 1867 au 1er janvier 1887, les entrées d'hommes et de femmes, et la proportion d'alcoolisés dans les deux sexes sont les suivantes (*page* 356).

Jusqu'en 1887, le relevé des alcoolisés simples, c'est-à-dire de ceux qui doivent leur délire uniquement aux excès de boissons, avait seul été fait. A partir de cette époque, on retint également tous les psychopathes, descendants pour la plupart d'alcooliques, et chez lesquels l'alcool n'avait été que le coup de fouet qui avait mis à découvert leurs conceptions délirantes.

Nous avons dressé des uns et des autres, le tableau suivant: (*voir page 357.*)

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(1) Magnan—Note sur la statistique des malades alcooliques entrés au Bureau Central d'Admission de 1867 à 1906.

BUREAU D'ADMISSION DES ASILES DE LA SEINE (STE. ANNE).

Années.	HOMMES.			FEMMES.		
	Nombre d'entrées.	Nombre d'alcooliques.	Proportion pour 100.	Nombre d'entrées.	Nombre d'alcooliques.	Proportion pour 100.
			%			%
1867 à partir du 1 Mai	834	144	17·14	744	24	3·22
1868	1397	197	14·17	1188	22	1·85
1869	1349	354	26·24	1083	57	5·26
1870	1460	377	25·82	1060	64	6·04
1871	1125	291	25·88	1072	61	5·70
1872	1393	182	13·13	1083	37	3·41
1873	1553	216	13·90	1195	39	3·26
1874	1362	221	16·22	1234	41	3·32
1875	1396	231	16·54	1120	81	7·32
1876	1401	316	22·25	1145	58	5·06
1877	1464	298	20·35	1360	45	3·30
1878	1647	288	17·48	1274	44	3·43
1879	1471	368	25·15	1214	51	4·20
1880	1487	244	16·40	1198	33	2·74
1881	1664	312	18·75	1267	33	2·60
1882	1761	291	18·70	1312	34	2·81
1883	1867	281	15·05	1442	32	2·21
1884	2144	349	16·26	1630	54	3·31
1885	1921	427	22·22	1571	78	4·96
1886	2021	453	22·42	1560	91	5·83

On remarquera que le nombre des hommes entrés à l'asile est toujours resté supérieur à celui des femmes ; la situation retenue de 1801 à 1840 ne s'est plus représentée.

Si l'on considère le pourcentage des alcoolisés simples, hommes et femmes, par rapport au nombre total des entrées, on note ces dernières années un certain fléchissement.

Cela ne veut malheureusement pas dire que l'alcool fait moins de victimes ; en effet, les hôpitaux ont pris coutume de recevoir, de plus en plus nombreux, des alcoolisés délirants chez lesquels les accidents disparaissent après quelques jours de repos et de sevrage : ces malades n'entrent souvent pas à l'Asile ; cela est si vrai que le pourcentage des psychopathes avec appoint alcoolique chez lesquels les accidents réveillent un état névropathique sous-jacent s'élève pendant ces mêmes années.

L'alcoolisme chez la femme devient plus fréquent. Si l'on excepte l'année 1911 qui ne donne que 7·11%, le pourcentage a varié de 1906 à 1910 entre 8·41% et 10·11% ; de 1887 à 1890, il n'avait été que de 3·92% à 8·27%.

C'est là une constatation désastreuse et qui fera souvent redouter chez l'enfant une double hérédité alcoolique.

* * *

Comment tous ces malades se classent-ils au point de vue clinique ? Arrêtés la veille ou l'avant-veille, ou entrés du jour même, au Service

Années.	Entrées totales à l'admission.			Alcoolisés Simples.					Psychopathes avec appoint alcoolique.					Totaux des alcoolisés simples et des psychopathes alcooliques.				Total général.
	Hommes.	Femmes.	Total.	Hommes.	%	Femmes.	%	Total.	Hommes.	%	Femmes.	%	Total.	Hommes.	%	Femmes.	%	
1887	1964	1479	3443	488	24·85	58	3·92	546	258	13·13	102	6·89	360	746	37·98	160	10·82	906
1888	2103	1500	3603	477	22·68	88	5·86	565	265	12·60	97	6·46	362	742	35·28	185	12·33	927
1889	2065	1547	3612	521	25·23	128	8·27	649	164	7·94	57	3·68	221	685	33·17	185	11·96	870
1890	1976	1542	3518	542	27·43	122	7·91	664	154	7·79	50	3·24	204	696	35·22	172	11·15	868
1891	2030	1473	3503	558	27·49	127	8·62	685	157	7·73	76	5·16	233	715	35·22	203	13·78	918
1892	2051	1583	3634	632	30·81	136	8·59	768	184	8·97	86	5·43	270	816	39·78	222	14·02	1038
1893	1844	1484	3328	559	30·31	123	8·29	682	172	9·33	90	6·06	262	731	39·64	213	14·35	944
1894	2072	1668	3740	624	30·11	151	9·05	775	166	8·01	63	3·77	229	790	38·13	214	12·83	1004
1895	2032	1583	3615	602	29·63	170	10·74	772	216	10·63	77	4·86	293	818	40·26	247	15·60	1065
1896	2088	1669	3757	644	30·84	156	9·34	800	256	12·26	87	5·21	343	900	43·10	243	14·56	1143
1897	1924	1472	3396	590	30·66	137	9·31	727	284	14·76	136	9·24	420	874	45·42	273	18·55	1147
1898	1891	1534	3425	564	29·82	156	10·17	720	228	12·06	94	6·13	322	792	41·88	250	16·30	1042
1899	1788	1446	3234	585	32·72	117	8·09	702	250	13·98	118	8·16	368	835	46·70	235	16·25	1070
1900	1872	1473	3345	587	31·35	131	8·89	718	359	19·18	138	9·37	497	946	50·53	269	18·26	1215
1901	1911	1618	3529	520	27·21	136	8·40	656	396	20·72	198	12·24	594	916	47·93	334	20·64	1250
1902	2014	1758	3772	645	32·02	184	10·47	829	319	15·84	202	11·49	521	964	47·86	386	21·96	1350
1903	1949	1649	3598	526	26·99	186	11·28	712	279	14·31	146	8·85	425	805	41·30	332	20·13	1137
1904	1905	1634	3539	439	23·04	138	8·44	577	354	18·58	299	18·30	653	793	41·63	437	26·74	1230
1905	1802	1637	3439	432	23·97	139	8·49	571	246	13·65	135	8·25	381	678	37·62	274	16·74	952
1906	1893	1652	3545	477	25·20	167	10·11	644	265	14·65	125	7·56	390	742	39·20	292	17·67	1034
1907	2108	1686	3794	619	29·36	166	9·85	785	372	17·65	122	7·23	494	991	47·01	288	17·08	1279
1908	2061	1734	3795	535	25·96	164	9·46	699	397	19·26	136	7·84	533	932	45·22	300	17·30	1232
1909	2107	1754	3861	499	23·68	151	8·61	650	438	20·79	156	8·89	594	937	44·47	307	17·50	1244
1910	2099	1783	3882	432	20·58	150	8·41	582	558	26·58	212	11·89	770	990	47·16	362	20·30	1352
1911	2020	1801	3821	374	18·51	128	7·11	502	417	20·64	179	9·94	596	791	39·16	307	17·04	1098
Totaux	49,569	40,159	89,728	13,471	27·17	3,509	8·74	16,980	7,154	14·43	3,181	7·92	10,335	20,625	41·61	6,690	16·66	27,315

Central d'Admission, ces malades se présentent dans des conditions particulièrement favorables à l'examen clinique.

Leur aspect est très variable : s'habitue-t-il à boire de l'alcool, au bout de peu de temps, l'homme change de caractère, se montre irritable, inquiet, impressionnable, il n'a plus de sommeil ; il devient le jouet d'illusions et d'hallucinations, et lorsque, après des excès répétés, il dépasse la limite de saturation, ou qu'il est soumis à quelque autre cause d'excitation, il est pris d'un accès de *délire alcoolique*.(1)

Celui-ci se caracterise par des hallucinations presque toujours de nature pénible, très mobiles, reproduisant soit les occupations ordinaires, soit les préoccupations dominantes du moment.

D'intensité variable, les hallucinations donnent lieu à des réactions différentes, d'où parmi les plus fréquentes, les formes maniaque, mélancolique, stupide de la folie alcoolique.

Le malade s'adonne-t-il à *l'absinthe* ? la symptomatologie diffère.

Dans l'absinthisme, le délire hallucinatoire existe plus actif, plus terrifiant, provoquant parfois des réactions d'une violence extrême des plus dangereuses. Un autre syndrome beaucoup plus grave l'accompagne : tout à coup l'absinthique pousse un cri, pâlit, perd connaissance et tombe ; les traits se contractent, les mâchoires se resserrent, les pupilles se dilatent, les yeux se dévient en haut, les membres se raidissent, un jet d'urine s'échappe, des gaz et des matières sont brusquement expulsés. Au bout de quelques secondes la figure devient grimaçante, les membres sont secoués, les yeux sont fortement convulsés en tous sens, les mâchoires s'entrechoquent et la langue projetée entre les arcades dentaires est profondément mordue ; une salive sanglante recouvre les lèvres, la face s'injecte, devient violacée, bouffie, les yeux sont saillants, larmoyants, la respiration est stertoreuse, puis les mouvements cessent, tout le corps est en résolution, les sphincters se relâchent, des déjections souillent le malade. Au bout d'un instant, celui-ci soulève la tête et promène autour de lui un regard hébété. Revenu à lui peu après, il ne conserve aucun souvenir de ce qui s'est passé. C'est bien l'attaque d'épilepsie. D'autres fois la manifestation est moins bruyante : l'individu pâlit, quelques petites secousses se montrent à un coin des lèvres et, pour un instant, il reste étranger à tout ce qui se passe autour de lui : il a un vertige.

Si ces accidents se répétent, il peut survenir un accès délirant d'une acuité extrême pendant lequel, contrairement à ce qui se passe dans le délire alcoolique simple où une interpellation un peu vive suffit à suspendre momentanément le délire, le malade reste sourd à toute intervention et se livre presque automatiquement aux actes les plus violents. Quelquefois encore, une autre différence symptomatique distingue le buveur d'absinthe

(1) De l'Alcoolisme des diverses formes du délire alcoolique et de leur traitement. Magnan. Delahaye, éditeur, Paris, 1874. A été traduit en Anglais.

de l'alcoolique simple, c'est l'apparition prématurée du délire, si bien que l'individu présente un accès de délire hallucinatoire très intense sans tremblement ou avec des troubles moteurs peu accusés. En résumé, à l'actif de l'absinthisme s'ajoutent les syndromes suivants : délire prématuré, attaque épileptique, vertige, délire hallucinatoire plus actif, plus impulsif, parfois même inconscient, très dangereux.

Ces faits cliniques, déjà si éloquents par eux-mêmes, sont corroborés par l'expérimentation physiologique.(1)

Que l'intoxication alcoolique se prolonge et un nouvel élément intervient(2) ; l'état du sujet est modifié. A la longue on ne voit plus seulement des troubles fonctionnels, des modifications passagères ne laissant après elles qu'un léger malaise ; une action plus profonde s'est produite, la nutrition est altérée dans tous les organes, tous les systèmes, tous les tissus. L'intoxication alcoolique est devenue chronique, le malade, la mémoire affaiblie, le jugement moins sûr, l'imagination éteinte, l'association des idées amoindrie, la sensibilité morale abaissée, apathique, indifférent et hébété, est livré sans défense aux caprices de ses appétits instinctifs. Au point de vue physique, tantôt les troubles médullaires prédominent : picotements de la peau, engourdissements, fourmillements, sensations anormales de froid et de chaud, crampes, hyperesthésie superficielle ou profonde, anesthésie cutanée ou musculaire, faiblesse, tremblement des jambes et des bras, paresse des réservoirs, en un mot tous les phénomènes se rattachant aux myélites diffuses sur lesquelles Hallopeau a attiré l'attention(3) ; tantôt on note de petits ictus apoplectiques ou épileptiformes s'accompagnant soit d'une parésie passagère d'un bras ou d'une jambe, soit d'empâtement et de gêne de la parole qui peut ressembler à de l'hésitation de la parole, parfois on note de l'inégalité des pupilles. Les uns se présentent sous les dehors du paralytique général, mais lorsque les symptômes suraigus dus à l'appoint alcoolique ont disparu, l'alcoolique chronique vulgaire reparaît ; les autres moins nombreux s'acheminent vers la paralysie générale.(4)

Parfois enfin, à l'occasion de libations trop copieuses, d'un traumatisme, d'une maladie infectieuse ou pour toute autre cause, éclate chez un alcoolique chronique un accès de *delirium tremens*.

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De ces diverses formes de l'intoxication alcoolique simple, nous avons dressé le tableau suivant.

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(1) Magnan—Rapport sur le Service Central de l'Admission, 1906.

(2) Magnan—De l'Alcoolisme.

(3) Hallopeau—Archives générales de Médecine.

(4) Magnan—Du rôle de l'alcoolisme dans l'étiologie de la Paralysie générale—Congrès de Lyon, 1891.

FORMES DE L'INTOXICATION ALCOOLIQUE SIMPLE.

Années.	Delirium tremens.			Délire alcoolique.			Alcoolisme chronique.			Absinthisme.			Totaux.		
	Hommes.	Femmes.	Totaux.	Hommes.	Femmes.	Totaux.	Hommes.	Femmes.	Totaux.	Hommes.	Femmes.	Totaux.	Hommes.	Femmes.	Totaux.
1888	2	...	2	235	58	293	234	30	264	6	...	6	477	88	565
1889	2	2	4	295	101	396	220	25	245	4	...	4	521	128	649
1890	3	...	3	311	89	400	215	33	248	13	...	13	542	122	664
1891	1	...	1	298	78	376	255	49	304	4	...	4	558	127	685
1892	13	3	16	293	70	363	322	63	385	4	...	4	632	136	768
1893	6	2	8	238	57	295	308	64	372	7	...	7	559	123	682
1894	...	...	...	282	90	372	332	60	392	10	1	11	624	151	775
1895	11	...	11	188	82	270	394	87	481	9	1	10	602	170	772
1896	6	...	6	185	47	232	432	109	541	21	...	21	644	156	800
1897	6	...	6	197	45	242	377	90	467	10	2	12	590	137	727
1898	5	...	5	179	47	226	374	106	480	6	3	9	564	156	720
1899	5	...	5	145	24	169	425	91	516	10	2	12	585	117	702
1900	1	1	2	159	30	189	425	99	524	2	1	3	587	131	718
1901	2	...	2	134	30	164	378	104	482	6	2	8	520	136	656
1902	4	2	6	116	28	144	517	154	671	8	...	8	645	184	829
1903	2	...	2	123	25	148	391	159	550	10	2	12	526	186	712
1904	2	1	3	82	20	102	350	117	467	5	...	5	439	138	577
1905	...	...	...	50	10	60	378	129	507	4	...	4	432	139	571
1906	1	...	1	27	6	33	446	161	607	3	...	3	477	167	644
1907	1	...	1	37	8	45	579	158	737	2	...	2	619	166	785
1908	1	...	1	37	9	46	494	155	649	3	...	3	535	164	699
1909	...	...	...	11	11	22	484	147	631	4	1	5	499	159	658
1910	...	...	...	4	10	14	425	140	565	3	...	3	432	150	582
1911	...	...	...	8	...	8	364	128	492	2	...	2	374	128	502

On notera que les malades atteints de délire alcoolique diminuent, alors que les alcoolisés chroniques augmentent. Nous avons déjà indiqué que les premiers de ces malades entrent souvent aujourd'hui à l'hôpital, mais en outre, les progrès de la clinique permettent de mieux dégager sous le bruyant cortège du délire alcoolique, les manifestations de l'alcoolisme chronique, et celles-ci sont très fréquentes.

Au point de vue de la race, cette population envahie par le poison n'est malheureusement pas stérile et comme on l'a depuis longtemps répété, "l'ivrogne n'engendre rien qui vaille." Bourneville a donné à cet égard une statistique devenue classique :(1)

Pour 3,271 enfants entrés dans son service, cet auteur nota que 1,156 fois le père avait fait des excès de boissons, 100 fois les excès étaient imputables à la mère, 53 fois à tous deux ; 538 fois, il ne fut pas possible d'avoir de renseignements, 1,124 fois, les père et mère étaient sobres, dit l'auteur. Pour 298 malades, il y eut certitude absolue de l'ivresse du père ou de la mère au moment de la conception et 122 fois probabilité.

Le pourcentage de ces diverses catégories donne :

35·3% de pères ayant fait des excès de boissons,
3·2% de mères,
1·6% tous deux,

soit 40·6% de parents faisant des excès de boissons,
et 43·5% de parents sobres.

Nous estimons ces chiffres au-dessous de la vérité surtout en ce qui concerne l'alcoolisme de la mère, qui, malheureusement devient de plus en plus fréquent ; sur 1,000 enfants d'alcooliques, 1/3 environ disparaît à la naissance ou dans les 2 ou 3 premières années, et parmi les survivants on compte de nombreux idiots, épileptiques, et beaucoup de dégénérés dénués de sens moral, instinctivement pervers, impulsifs, anormaux(2), victimes douloureuses de l'alcoolisme des parents : l'un de nous a pu écrire en 1910 qu'il suffit de porter les regards sur le grand groupe des dégénérescences mentales—triste descendance des alcoolisés—pour s'assurer que l'alcoolisme fournit aux quartiers d'hommes des asiles de la Seine les 3/4 de leur population.(3)

La plupart de ces malheureux dégénérés, lesquels présentent des dégradations physiques, intellectuelles et morales, comptent des alcoolisés parmi leurs ascendants : ils doivent à cette triste origine leur déséquilibration mentale, sol de prédilection dans tous les troubles psychiques.

(1) Recherches cliniques et thérapeutiques sur l'épilepsie, l'hystéric, et l'idiotic.
(2) Magnan—Rapport sur le Service Central de l'Admission, 1900.
(3) Magnan—Rapport sur le Service Central de l'Admission, 1910.

C'est là un résultat des plus navrants de l'alcoolisme qui, non seulement transforme profondément l'individu, mais transmet à ses descendants des tares qui en font des malades ou des criminels, dont le seul profit pour la société est une lourde charge, ou un danger(1). Plusieurs d'entre eux font des séjours alternatifs à l'asile et à la prison.

Chez les enfants issus de telles unions se révélent une susceptibilité nerveuse excessive, une excitabilité reflexe anormale ; ceux que la tuberculose ou les convulsions ne tuent pas présentent souvent une appétence particulière pour les boissons alcooliques, et le besoin impérieux d'en user.

Cette constatation, maintes fois révélée par les travaux de l'Admission est devenue classique ; Legrain notamment l'a notée 63 fois sur 102 cas(2).

Comment s'étonner dès lors si l'accroissement du nombre des dégénérés marche de pair avec les progrès de l'alcoolisme !

Ces malades présentent au point de vue clinique un haut intérêt. Chez eux, l'alcool provoque très souvent l'explosion d'un délire dont l'intensité est si peu en rapport avec les excès commis qu'il faut bien faire appel pour l'expliquer à la notion de dégénérescence.

Presque tous se présentent à l'asile avec un délire alcoolique assez actif, qui disparaît en général très vite laissant à découvert des troubles psychiques qui, sans l'excitation de l'appoint éthylique, seraient restés à l'état latent, mais qui une fois développés, durent beaucoup plus longtemps que l'accès alcoolique dont ils sont tributaires ; l'alcool a mis en effet en jeu leurs dispositions délirantes. En résumé ces malades sont guéris de l'accès éthylique mais celui-ci est remplacé par une psychose beaucoup plus tenace que l'excitation alcoolique a réveillée(3).

Toutes les formes mentales peuvent être observées : les états maniaque ; mélancolique, stupide : les délires polymorphes ou systématisés, les idées fixes, la préoccupation du mot, du chiffre, les phobies de toute sorte, les obsessions, les impulsions, manifestations symptomatiques qui imposent une grande attention lorsqu'elles ont pour objet une perversion du sens génital, ou le vol, l'incendie, l'homicide, etc., tous ces syndrômes soulèvent au point de vue philosophique, psychologique, social, médico-légal, les questions les plus délicates (4).

Parmi les malades à perversions instinctives reçus à l'Admission, faut-il citer quelques exemples ? C'est ce malheureux garçon de 22 ans qui en était arrivé, malgré tous ses efforts pour résister, à plonger un canif dans la fesse des jeunes filles qu'il rencontrait. C'est après avoir frappé sa troisième victime, inconnue comme les autres, près de l'Eglise de la Trinité,

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(1) Magnan—Rapport sur le Service Central de l'Admission, 1905-1907.

(2) Hérédité et Alcoolisme, Paris, Doin, 1889.

(3) Magnan—Rapport sur le Service Central de l'Admission, 1906.

(4) Magnan—Rapport sur le Service Central de l'Admission, 1910.

qu'il a été arrêté. L'acte accompagné de spasme génital était suivi d'un immense soulagement qui mettait fin à l'angoisse.(1) Cet autre, chez lequel(2) l'éréthisme sexuel n'avait plus de limite à la vue d'un mouchoir de femme; il avait été quatre fois condamné pour vols de ces objets; il ne dérobait jamais que le mouchoir, laissant avec grand soin tout autre objet dans la poche fouillée.

Un autre malheureux, obsédé par le nombre 3, en était arrivé à se faire arracher 3 dents, quand il n'en avait que deux de gâtées. Toutes ses actions étaient combinées par 3; à table il demandait trois petits pains, 3 gigots, 3 verres de vin, 3 fromages, etc. Il se procure 3 cravates, 3 calepins, 3 crayons, il écrit 3 lettres de 3 pages et sur l'une d'elles adressée à sa soeur, il l'embrasse, elle, sa bonne et son chien, pour que cela fasse 3.

Parfois il était pris du besoin irrésistible de japper; s'il essayait de résister, il éprouvait un serrement en cercle à la base de la poitrine, et un point douloureux à la région épigastrique, il se sentait en outre, angoissé, avec un agacement très pénible aux mains et aux pieds, analogue, dit-il, aux décharges électriques. Dès qu'il avait pu aboyer imitant les jappements d'un chien qui l'avait autrefois mordu, il se calmait et se sentait soulagé.

Pour pouvoir donner satisfaction à ce besoin impérieux de japper et parfois aussi de rire et de pleurer sans motifs, il avait loué une chambre d'hôtel au fond d'un corridor, et là il se soulageait, dit-il, se déchargeait en aboyant parfois pendant plus d'une heure. Quoique occupant une chambre isolée, il jappait si fort que les locataires se plaignaient et qu'ils l'ont battu une fois, sans qu'il ait pu, malgré ses efforts, s'arrêter d'aboyer. Il avait en outre, par moments, des impulsions à déchirer, à briser, à voler, à prononcer des mots injurieux; il avait encore la folie du doute, la crainte du toucher et quelques autres phobies.

Ce déséquilibré, malgré ce nombre si varié de syndrômes, à cause même de cette multiplicité et de cette variété, était curable et a guéri en quelques mois à l'asile, tandis qu'il avait, au dehors, traîné pendant plusieurs années une existence des plus misérables.

Parmi ces dégénérés, nous avons encore plusieurs persécutés-persécuteurs fort dangereux et notamment la malade qui avait tiré sur le Docteur Gilles de la Tourette pour se venger des tortures que lui avaient fait subir les médecins et une autre femme qui, se disant hypnotisée à distance par Sarah Bernhardt, lui avait fait des menaces de mort. La mère de cette dernière-malade, également aliénée, très remuante, protestant, au dehors, contre la séquestration de sa fille, était parvenue à gagner à sa cause deux députés qui, mal informés assurément, avaient commencé des démarches pour faire cesser cette prétendue séquestration arbitraire.

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(1) Magnan—Rapport sur le Service Central de l'Admission, 1895.
(2) Magnan—Rapport sur le Service Central de l'Admission, 1894.

Signalons encore, dans le groupe des dégénérés persécutés-persécuteurs, cette femme qui, sous l'influence d'illusions, d'interprétations délirantes et d'idées de persécution était devenue meurtrière de l'Abbé de Broglie.

Ces faits sont-ils rares? Hélas la statistique suivante montrera combien sont fréquentes les manifestations de la folie, chez les héréditaires dégénérés. (*Voir Statistique, page 365.*)

" Ces malheureux naissent avec la marque de leur origine . . . Suivant le siège et la généralisation des lésions, suivant la localisation des troubles fonctionnels, ces types cliniques observés sont très variables. Mais malgré leur diversité, des transitions insensibles conduisent d'une extrémité de l'échelle à l'autre, de l'idiot complétement dégradé au dégénéré supérieur, intelligent mais déséquilibré. Nous n'avons ici que peu de chose à dire de l'idiot qui, rélégué dans la moelle, dans le mésocéphale ou dans le cerveau postérieur, vit d'une façon tantôt purement végétative tantôt uniquement instinctive; les excitations périphériques provoquent des reflexes médullaires ou cérébraux; mais ce ne sont que des reflexes simples. et les centres modérateurs n'interviennent jamais. Dès que la région frontale devient libre, le sujet commence à pénétrer dans le domaine de l'idéation, du contrôle; il cesse alors d'être idiot et s'élève à la dignité d'imbécile. La localisation des lésions à tel ou tel centre perceptif, à une étendue plus ou moins grande de la région antérieure, nous explique que telle ou telle faculté ait survécu au naufrage, et qu'il existe des *génies partiels*, des idiots savants. Chez les débiles, les déséquilibrés où se recrutent ceux des délinquants dont l'étude revient à la pathologie mentale, ce ne sont plus des lésions anatomiques grossières, mais bien des troubles fonctionnels qui tiennent sous leur dépendance les modifications de l'activité de l'axe cérébro-spinal. Ce qui prédomine chez eux, c'est la désharmonie et le défaut d'équilibre, non seulement entre les facultés mentales, les opérations intellectuelles proprement dites d'une part, les sentiments et les penchants d'autre part, mais encore la désharmonie des facultés intellectuelles entre elles, le défaut d'équilibre du moral et du caractère. Un héréditaire peut être un savant, un magistrat distingué, un mathématicien éminent, un politicien sagace, un administrateur habile, et présenter au point de vue moral, des défectuosités profondes, des bizarreries étranges, des écarts de conduite surprenants, et comme le côté moral, les sentiments et les penchants sont la base de nos déterminations, il s'ensuit que les facultés brillantes sont mises au service d'une mauvaise cause, c'est-à-dire d'instincts, d'appétits, de sentiments maladifs qui, grâce aux défaillances de la volonté, poussent aux actes les plus extravagants et parfois les plus dangereux.(1)

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(1) De l'enfance des criminels considérée dans ses rapports avec la prédisposition naturelle au crime.

Rapport de M. Magnan—au Congrès d'Anthropologie criminelle de 1889.

HÉRÉDITAIRES DÉGÉNÉRÉS.

Années.	Hommes.		Femmes.		Total.	Détail.									
						Hommes.					Femmes.				
						Déséquilibrés.	Débiles.	Imbéciles.	Idiots.	Total.	Déséquilibrées.	Débiles.	Imbéciles.	Idiotes.	Total.
		%		%											
1892	395	19·26	338	21·35	733	131	175	61	28	395	150	140	31	17	338
1893	406	22·02	299	20·15	705	125	218	43	20	406	132	146	16	5	299
1894	396	19·11	363	21·76	759	129	199	55	13	396	138	183	27	15	363
1895	481	23 67	336	21·22	817	175	231	65	10	481	151	150	20	15	336
1896	471	22 56	367	21·99	838	222	191	48	10	471	179	156	25	7	367
1897	385	20·01	294	20·00	679	138	168	56	23	385	104	138	26	26	294
1898	426	22·53	316	20·60	742	171	188	48	19	426	136	135	26	19	316
1899	458	25 61	304	21·02	762	172	199	60	27	458	124	109	46	25	304
1900	470	25·11	327	22·20	797	186	211	48	25	470	145	124	40	18	327
1901	542	28·36	455	28·12	997	206	249	63	24	542	229	171	38	17	455
1902	584	29·00	521	29 63	1105	239	247	74	24	584	234	210	59	18	521
1903	501	25·70	457	27·71	958	205	222	53	21	501	222	169	42	24	457
1904	614	32·23	534	32·68	1148	234	280	83	17	614	291	187	38	18	534
1905	550	30·52	580	35·43	1130	221	237	55	37	550	317	219	28	16	580
1906	607	32·06	547	33·11	1154	243	279	49	36	607	273	224	32	18	547
1907	680	32·26	560	33·21	1240	299	281	68	32	680	335	172	33	20	560
1908	645	31·30	597	34·43	1242	284	282	50	29	645	301	242	39	15	597
1909	746	35·40	619	35·90	1365	376	308	42	20	746	364	218	21	16	619
1910	665	31·68	641	35·95	1306	273	345	22	25	665	319	288	21	13	641
1911	712	35·25	623	34·59	1335	248	403	34	27	712	259	331	15	18	623

Nous avons tracé, des épileptiques entrés à l'Admission de 1880 à 1912, le Tableau suivant. Son total élevé ne rend qu'imparfaitement compte de l'étendue du mal. En effet, beaucoup de ces malheureux évitent l'asile, d'autres n'y rentrent qu'à la suite d'attaques plus fréquentes ou d'accès délirants dus le plus souvent à leurs propres excès de boissons.

Ceux-ci augmentent la fréquence et l'intensité des attaques et suscitent des accès délirants sans lesquels ces malades auraient pu continuer à travailler au-dehors et à suivre le traitement prescrit à la consultation externe.(1)

Quand ils sont tempérants, beaucoup d'entre eux peuvent continuer au dehors leur travail et même améliorer leur santé.(2)

Il en est ainsi notamment des femmes qui, plus sobres en général, peuvent, malgré l'épilepsie ou l'hystérie, continuer leurs occupations et vivre sans danger dans leurs familles ; parfois même leurs névroses s'amendent et les crises deviennent de plus en plus rares et ne s'accompagnent pas de délire.(3)

Par contre, le chiffre des épileptiques qui reviennent à l'asile à la suite d'excès nouveaux est élevé : en 1900, sur 160 épileptiques (96 hommes, 64 femmes), on compte dans ces circonstances. 51 rechutes (39 hommes, 12 femmes).

En 1905, la plupart des 124 rechutes (74 hommes, 50 femmes), ont la même origine.

ÉPILEPTIQUES

entrés à l'Admission de 1880 à 1911.

Années.	Hommes.	Femmes.	Total.	Années.	Hommes.	Femmes.	Total.
1880	138	50	188	1896	95	77	172
1881	149	48	197	1897	113	83	196
1882	123	62	185	1898	107	66	173
1883	169	99	268	1899	108	70	178
1884	170	80	250	1900	96	64	160
1885	175	91	266	1901	118	77	195
1886	154	68	222	1902	91	64	155
1887	134	59	193	1903	94	96	190
1888	128	81	209	1904	91	73	164
1889	125	72	197	1905	74	50	124
1890	128	59	187	1906	93	66	159
1891	136	47	183	1907	86	71	157
1892	157	42	199	1908	92	73	165
1893	123	58	181	1909	92	75	167
1894	123	51	174	1910	108	72	180
1895	87	70	157	1911	97	71	168

(1) Rapport Magnan, 1901.

(2) Rapport Magnan, 1904.

(3) Rapport Magnan, 1901.

En 1911, les épileptiques ne sont pas moins de 168 (97 hommes, 71 femmes). (*Voir tableau page 166.*)

* * *

Fléau redoutable pour l'individu qu'il pousse vers l'asile, l'hôpital ou la prison, l'alcoolisme est pour la Société un pesant fardeau. Qui dira jamais les dépenses énormes qu'il met chaque année à la charge de la collectivité pour la création et le fonctionnement de ces différents services; qui dira quels capitaux sont chaque année perdus par suite de chômages, pour l'agriculture et l'industrie nationales? Quelle part lui incombe dans la dégénérescence de la race? les souffrances qu'il enfante, les pleurs qu'il a fait verser?

Peut-on songer dès lors sans effroi, à la lourde responsabilité morale qu'assument les buveurs vis-à-vis d'eux-mêmes, de la Société, de l'Humanité même?

C'est le mérite de l'" Eugénics Congress " de vulgariser de telles notions. Aussi est-ce par une association d'idées que vous avez pénétrée que l'un de nous, médecin en chef du Service de l'Admission de l'Asile Clinique Sainte-Anne, qui déjà en Angleterre au Congrès de Norwich en 1874, dégageait l'influence de l'alcoolisme sur la race, plaçait voici de longues années, dans la salle même où il examine les malades, en face d'eux, bien en vue, l'admirable portrait de l'illustre Darwin!

ALCOHOLISM AND DEGENERACY.

Statistics of the Central Service for the Admission of Insane Persons for the Town of Paris and for the Department of the Seine, from 1867-1912.

By MM. MAGNAN,

Physician in Chief for the Asylum of St. Anne, Member of the Academy of Medicine,

And A. FILLASSIER,

Member of the Clinical Society of Mental Medicine, and of the Society of Medicine, Paris.

Since 1867, all the insane from Paris and the Seine department are placed under the central service of admission to the clinical Asylum of St. Anne (Bureau Central d'Admission), where, before being transferred to the different asylums, they are submitted to a more or less lengthy examination.

For each of them a history-book is started; it contains also the text of the certificates granted by the doctor, the clinical facts which he has

obtained in the course of his observations, and the information furnished by the parents or friends of the patient.

All this results in a considerable collection of precious documents. It has seemed to us worth while to make an abstract of these, on the occasion of the first "International Eugenics Congress," and to try to gather from them the lessons which they contain, directing our attention more specially to the effects of alcohol on the individual and his offspring.

A first question suggests itself: among the unfortunates brought by insanity to the asylum, how many are driven there by alcohol? The part here played by alcohol is considerable, and since 1867, has been constantly on the increase. Nay, more: since its appearance, alcohol has modified the very appearance of our asylums.

According to the reports of M. Husson, Director of the Public Assistance from 1801 to 1840, the entries, male and female, taken over periods of six years, show more women than men; from 1841 to 1863 the result is the same, except for the three years 1843, 1845, and 1859, where the men are ahead by a few units.

1843	...	2045 entries	1046 men	999 women
1843	...	2083	618	609
1859	...	1923	977	946

This predominance of insanity among women was attributed to her more nervous temperament, to her higher sensitiveness and emotionalism.

But after 1863, the figures of male entries, which had been gradually rising, exceeds at first by a few dozen the number of females and after that the excess of males rapidly rises to hundreds.

A new factor, alcohol, has entered the scene, more perilous for man than for woman; it poisons him, makes him mad, and brings him to the insane asylum.

1863	...	2045 entries	1046 men	999 women
1864	...	2083	1057	1026
1865	...	2248	1203	1045
1866	...	2445	1297	1148 (1)

From May 1st, 1867, to January 1st, 1887, the entries of men and women and the proportion of alcoholics in the two sexes are as follows:— (*see page 369*).

Until 1887 the only return that had been made was that of simple alcoholics, that is, those whose insanity was entirely due to excess of drink. After this period, there were scheduled in like manner all the psychopaths, who are chiefly descendants of alcoholics, and in whose case alcohol had only been the determining element which had put in operation their temperamental insanity. We have set forth both classes in the following table:—(*see page 370*).

BUREAU OF ADMISSION TO THE ASYLUMS OF THE SEINE (ST. ANNE).

Years.	MEN.			WOMEN.		
	Entries.	Alcoholics.	Proportion per 100.	Entries.	Alcoholics.	Proportion per 100.
			%			%
1867 Starting from May 1st.	834	144	17·14	744	24	3·22
1868	1397	197	14·17	1188	22	1·85
1869	1349	354	26·24	1083	57	5·26
1870	1460	377	25·82	1060	64	6·04
1871	1125	291	25·88	1072	61	5·70
1872	1393	182	13·13	1083	37	3·41
1873	1553	216	13·90	1195	39	3·26
1874	1362	221	16·22	1234	41	3·32
1875	1396	231	16·54	1120	81	7·32
1876	1401	316	22·25	1145	58	5·06
1877	1464	298	20·35	1360	45	3·30
1878	1647	288	17·48	1274	44	3·43
1879	1471	368	25·15	1214	51	4·20
1880	1487	244	16·40	1198	33	2·74
1881	1664	312	18·75	1267	33	2·60
1882	1761	291	18·70	1312	34	2·81
1883	1867	281	15·05	1442	32	2·21
1884	2144	349	16·26	1630	54	3·31
1885	1921	427	22·22	1571	78	4·96
1886	2021	453	22·42	1560	91	5·83

We may note that the number of men who enter the asylum has always remained in excess of that of women; the condition shown between 1801 and 1840 does not reappear.

If we now consider the percentage of simple alcoholics, men and women, in proportion to the total number of entries, we notice in these last years a certain decline. This, unfortunately, does not mean that alcohol makes less victims; in fact, the hospitals now regularly take in, more and more frequently, insane alcoholics, whose symptoms disappear after a few days rest and abstention. These patients do not often reach the asylum. This is so true, that the percentage of psychopaths with an alcoholic determinant, in whose case accidents reveal an underlying neuropathic condition, shows an increase during the same years. Alcoholism in females is becoming more frequent. With the exception of the year 1911, which only shows 7.11%, the percentage has varied from 1906 to 1910 between 8.41 and 10.11%, while between 1887 and 1890 the figures were between 3.92 and 8.27%.

These are disastrous facts, and will often bring to bear on the children an hereditary alcoholic taint from both sides.

How are these patients classified from the clinical point of view? Taken up a day of two before, or sometimes on the very same day, to the Central Bureau, these patients come under observation in circumstances peculiarly favourable to clinical examination.

Their appearance varies much. After succumbing to the drinking habit, at the end of a short time the man's character changes; he becomes

Years.	Total Entries for Admission.			Simple Alcoholics.					Psychopaths with alcoholic set-off.					Alcoholics and psychopaths.				Grand Total
	Men.	Women.	Total.	Men.		Women.		Total.	Men.		Women.		Total.	Men.		Women.		
					%		%			%		%			%		%	
1887	1964	1479	3443	488	24·85	58	3·92	546	258	13·13	102	6·89	360	746	37·98	160	10·82	906
1888	2103	1500	3603	477	22·68	88	5·86	565	265	12·60	97	6·46	362	742	35·28	185	12·33	927
1889	2065	1547	3612	521	25·23	128	8·27	649	164	7·94	57	3·68	221	685	33·17	185	11·96	870
1890	1976	1542	3518	542	27·43	122	7·91	664	154	7·79	50	3·24	204	696	35·22	172	11·15	868
1891	2030	1473	3503	558	27·49	127	8·62	685	157	7·73	76	5·16	233	715	35·22	203	13·78	918
1892	2051	1583	3934	632	30·81	136	8·59	768	184	8·97	86	5·43	270	816	39·78	222	14·02	1038
1893	1844	1484	3328	559	30·31	123	8·29	682	172	9·33	90	6·06	262	731	39·64	213	14·35	944
1894	2072	1668	3740	624	30·11	151	9·05	775	166	8·01	63	3·77	229	790	38·13	214	12·83	1004
1895	2032	1583	3615	602	29·63	170	10·74	772	216	10·63	77	4·86	293	818	40·26	247	15·60	1065
1896	2088	1669	3757	644	30·84	156	9·34	800	256	12·26	87	5·21	343	900	43·10	243	14·56	1143
1897	1924	1472	3396	590	30·66	137	9·31	727	284	14·76	136	9·24	420	874	45·42	273	18·55	1147
1898	1891	1534	3425	564	29·82	156	10·17	720	228	12·06	94	6·13	322	792	41·88	250	16·30	1042
1899	1788	1446	3234	585	32·72	117	8·09	702	250	13·98	118	8·16	368	835	46·70	235	16·25	1070
1900	1872	1473	3315	587	31·35	131	8·89	718	359	19·18	138	9·37	497	946	50·53	269	18·26	1215
1901	1911	1618	3529	520	27·21	136	8·40	656	396	20·72	198	12·24	594	916	47·93	334	20·64	1250
1902	2014	1758	3772	645	32·02	184	10·47	829	319	15·84	202	11·49	521	964	47·86	386	21·96	1350
1903	1949	1649	3598	526	26·99	186	11·28	712	279	14·31	146	8·85	425	805	41·30	332	20·13	1137
1904	1905	1634	3539	439	23·04	138	8·44	577	354	18·58	299	18·30	653	793	41·63	437	26·74	1230
1905	1802	1637	3439	432	23·97	139	8·49	571	246	13·65	135	8·25	381	678	37·62	274	16·74	952
1906	1893	1652	3515	477	25·20	167	10·11	644	265	14·65	125	7·56	390	742	39·20	292	17·67	1034
1907	2108	1686	3794	619	29·36	166	9·85	785	372	17·65	122	7·23	494	991	47·01	288	17·08	1279
1908	2061	1734	3795	535	25·96	164	9·46	699	397	19·26	136	7·84	533	932	45·22	300	17·30	1232
1909	2107	1754	3861	499	23·68	151	8·61	650	438	20·79	156	8·89	594	937	44·47	307	17·50	1244
1910	2099	1783	3882	432	20·58	150	8·41	582	558	26·58	212	11·89	770	990	47·16	362	20·30	1352
1911	2020	1801	3821	374	18·51	128	7·11	502	417	20·64	179	9·94	596	791	39·16	307	17·04	1098
Total	49,569	40,159	89,728	13,471	27·17	3,509	8·74	16,980	7,154	14·43	3,181	7·92	10,335	20,625	41·61	6,690	16·66	27,315

irritable, restless, excitable; he loses his sleep; he becomes the sport of illusions and hallucinations; and when, after repeated excess, he passes the saturation limit, or is made the subject of any other exciting stimulus, he then falls victim to an attack of alcoholic delirium.*

This is characterized by hallucinations almost always of a distressing kind, very changeable, and reproducing either the ordinary occupations, or the dominant preoccupation of the moment.

The intensity of the hallucinations varies, and they give place to different reactions; among the most frequent of which are the forms of alcoholic insanity known as the maniacal, the melancholic, and the idiotic.

Is the patient given to absinthe? Then the symptomatology is different. In Absinthism the hallucination insanity is more active, more terrifying, sometimes provoking most dangerous reactions of extreme violence. It is accompanied by another syndrome of great gravity; all at once the absinth-drinker shouts out, grows pale, loses consciousness, and falls; the features contract, the jaws are clenched, the pupils dilate, the eyes turn upwards, the limbs stiffen, urine is passed, gas and faeces are smartly expelled. At the end of some seconds the face is contorted, the limbs shake, the eyes are turned convulsively in all directions, the jaws are snapped, the tongue protruded between the teeth and severely bitten; a bloody saliva covers the lips; the face becomes injected, blue and puffy; the eyes become prominent and fill with tears, the breathing is stertorous; then the movements cease, the body becomes all relaxed, the sphincters loose their hold. A moment later the man raises his head, and looks about him with a dull stare. Coming to himself a little later, he has no recollection at all of what has happened; it is exactly like an attack of epilepsy. At other times the manifestation is less acute; the individual pales, some little twitches show at the corner of his lips, and for a moment he is completely ignorant of all that goes on around him; he has a vertigo. If these accidents recur, there may supervene an attack of delirium of great intensity, during which—contrary to what happens with the simple alcoholic, where a little lively interference serves to stop the delirium for a moment—the patient is heedless of all interference, and gives himself over almost automatically to acts of the most violent character. Sometimes also another symptomatic difference distinguishes the drinker of absinthe from the ordinary alcoholic, and that is the unheralded appearance of delirium; so much so that the individual has a sudden attack of delirium with hallucinations of great intensity without a single preceding tremor, or without his motor powers being markedly impaired. To sum up: to the credit of absinthe we must add the following symptoms; sudden delirium, epileptic attacks, vertigo, hallucinatory delirium more active and more impulsive than with alcohol, and sometimes very dangerous because unconscious.

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* (See "Alcoholism des Diverses forme du delire alcoolique et de leur traitement," by Magnan, Delahaye, 1874 ouvrage traduit en anglais, Paris.)

These clinical facts, already so eloquent of themselves, are corroborated by physiological experiment (1.) The intoxication from alcohol comes to extend over a gradually longer period, and a new element enters; the condition of the subject is modified (2). In the end, we see no longer merely functional troubles, transient disturbances which leave after them only a slight malaise; a more profound action has set in; the nutrition is altered in every organ, every system, every tissue. The alcoholic intoxication has become chronic; his memory weakened, his judgment impaired, his imagination ruined, his association of ideas reduced, his moral sense lowered, apathetic, indifferent, and blunted, the victim is handed over defenceless to the caprice of his instinctive appetites. From the physical point of view, presently medullary mischief becomes prominent; pins-and-needles, numbness, formication, abnormal sensations of cold and heat, cramps, superficial or deep hyperæsthesia, cutaneous or muscular anæsthesia, weakness, trembling of the legs and arms, excretory paresis; in a word, all the phenomena which attach to diffuse myelitis, to which Hallopeau has drawn attention (3). Soon appear little apoplectic or epileptiform strokes, accompanied perhaps by a transient paresis of arm or leg, perhaps with a thickness and embarassment of speech, which may resemble word-hesitation; and sometimes one sees inequality of the pupils. Some of them look like general paralytics, but when the acute symptoms due to the alcoholic bout have faded, there reappears the common chronic alcoholic; the others, less in number, pass on into general paralysis (4). Sometimes also, as a result of too copious libations, of a traumatism, of an infectious disease, or indeed any other cause, there bursts upon the chronic alcoholic an attack of delirium tremens.

Of these various forms of simple alcoholic intoxication we have prepared the following table :—

We may note that the patients for alcoholic delirium show a diminution, while the chronic alcoholics are on the increase. We have already indicated that to-day the first class of these are admitted to hospital; but besides this, clinical progress now enables us better to pick out, among the noisy company of alcoholic delirium, the manifestations of chronic alcoholism; and these are very frequent.

From the racial point of view, this poisoned population is not, unfortunately, sterile, and, as is often repeated, "The drunkard begets nothing that is any good." Bourneville has given to this effect statistics which have become classical (5).

Among 3,271 children on his list, this author noted that in 1,156 cases the father had been an excessive drinker, in 100 excess was attributed to

(1) Magnan—*Rapport sur le service centrale*, 1906.
(2) Magnan—*De l'Alcoolisme.*
(3) Hallopeau—*General Archives of Medicine.*
(4) Magnan—*The place of alcoholism in the etiology of general paralysis.* Congress of Lyons, 1891.
(5) Bourneville—Clinical and therapeutic researches on hysteria, epilepsy, and idiotism.

FORMS OF SIMPLE ALCOHOLIC INTOXICATION.

Years.	Delirium tremens.			Alcoholic delirium.			Chronic alcoholism.			Absinthism.			Totals.		
	Males.	Females.	Totals.	Males.	Females.	Totals.	Males.	Females.	Totals.	Males.	Females.	Totals.	Males.	Females.	Totals.
1888	2	...	2	235	58	293	234	30	264	6	...	6	477	88	565
1889	2	2	4	295	101	396	220	25	245	4	...	4	521	128	649
1890	3	...	3	311	89	400	215	33	248	13	...	13	542	122	664
1891	1	...	1	298	78	376	255	49	304	4	...	4	558	127	685
1892	13	3	16	293	70	363	322	63	385	4	...	4	632	136	768
1893	6	2	8	238	57	295	308	64	372	7	...	7	559	123	682
1894	...	...	...	282	90	372	332	60	392	10	1	11	624	151	775
1895	11	...	11	188	82	270	394	87	481	9	1	10	602	170	772
1896	6	...	6	185	47	232	432	109	541	21	...	21	644	156	800
1897	6	...	6	197	45	242	377	90	467	10	2	12	590	137	727
1898	5	...	5	179	47	226	374	106	480	6	3	9	564	156	720
1899	5	...	5	145	24	169	425	91	516	10	2	12	585	117	702
1900	1	1	2	159	30	189	425	99	524	2	1	3	587	131	718
1901	2	...	2	134	30	164	378	104	482	6	2	8	520	136	656
1902	4	2	6	116	28	144	517	154	671	8	...	8	645	184	829
1903	2	...	2	123	25	148	391	159	550	10	2	12	526	186	712
1904	2	1	3	82	20	102	350	117	467	5	...	5	439	138	577
1905	...	...	...	50	10	60	378	129	507	4	...	4	432	139	571
1906	1	...	1	27	6	33	446	161	607	3	...	3	477	167	644
1907	1	...	1	37	8	45	579	158	737	2	...	2	619	166	785
1908	1	...	1	37	9	46	494	155	649	3	...	3	535	164	699
1909	...	...	...	11	11	22	484	147	631	4	1	5	499	159	658
1910	...	...	...	4	10	14	425	140	565	3	...	3	432	150	582
1911	...	...	...	8	...	8	364	128	492	2	...	2	374	128	502

the mother, and in 53 to both; in 538 there was no information, and in 1,124 the father and mother (says the author) were sober. In 298 cases there was absolute certainty that the father or the mother was drunk at the moment of conception, and a probability in 122. The percentages of these different categories come out thus: 35.3% fathers had drunk to excess, 3.2% mothers, and 1.6% both parents; or 40.6% parents excessive drinkers and 43.5% sober.

We consider these numbers in defect of the truth in respect of maternal alcoholism, which, unfortunately, is becoming more and more frequent. Of 1,000 children of alcoholics, about one-third disappears at birth or in the first two or three years; among the survivors are counted many idiots, epileptics, and a large number of degenerates destitute of moral sense, instinctively perverted, impulsive, abnormal, miserable victims of their parents' alcoholism. One of us wrote in 1910 that a glance at the great group of mental degeneracies, the result of parental alcohol, was enough to convince one that alcohol provides the men's quarters in the asylums of the Seine with three-quarters of their population (1). The greater part of these unfortunate degenerates, with their physical, mental, and moral defects, count alcoholics among their ascendants; to this miserable cause they owe their lack of mental balance, which is the root cause of all psychical mischief. This is one of the cruellest results of alcoholism, that it not only profoundly alters the individual, but transmits to his descendants defects which make of them invalids or criminals, of which the net result to society is a heavy surcharge and a serious danger (2). Several of them have made alternate sojourns at the asylum and at the prison.

Among the children that result from such unions we discover an excessive nervous susceptibility, an abnormal reflex excitability; those that are not killed by tuberculosis or convulsions often show a peculiar failing towards alcoholic drink, and an imperious craving for its use. These statistical facts, frequently revealed by the work of the admission bureau, have become classical; Legrain in particular has noted it 63 times in 102 cases (3). How can we wonder if from that time the number of degenerates shows an increase parallel with the progress of alcoholism?

These patients possess a high interest from the clinical point of view. With them alcohol often provokes an explosion of delirium, whose intensity is so out of proportion to the excess committed, that to explain it we have to fall back on the theory of degeneracy.

Almost all come to the asylum with a fairly active alcoholic delirium, which generally disappears very quickly, leaving unveiled the psychic troubles, which but for the excitement of the drinking bout would have remained latent, but which, once developed, remain far longer than the

(1) Magnan—Report, 1910.
(2) Magnan—Report, 1905-1907
(3) Doin, Paris, "Heredity and Alcohol," 1889.

alcoholic attack to which they are tributary; the alcohol has, in fact, set in action their insane tendencies. The result is that these people are cured of their drinking attacks, but this is replaced by a psychosis far more lasting than that awakened by the excitement of alcohol (1). All the mental forms may be observed; maniacal, melancholic, idiotic; delirium, polymorphic or systematic; fixed ideas, monomanias about words or numbers; every sort of phobia, obsessions, impulses—symptomatic manifestations which call for close attention. When they have for their object sexual perversion, theft, arson, or homicide, all these conditions give rise to the most delicate questions from the point of view of philosophy, psychology, sociology, or medical jurisprudence.

Among these victims of perverted instinct received at the bureau may we mention some examples? Here is a wretched youth of 22 who had been impelled, in spite of all his efforts to resist, to plunge a knife into the buttocks of the girls that he met. It was after having struck his third victim, a stranger to him like the others, near the Church of the Trinity, that he was arrested. The act, accompanied by a genital spasm, was followed by a great relief. Here is another, whose sexual erethism knew no bounds at the sight of a woman's handkerchief; for such thefts he had been sentenced four times; he never removed anything but the handkerchief, carefully leaving everything else in the pocket which he had picked. Another unfortunate, obsessed by the number three, had just been attempting to remove three of his teeth, though he had only succeeded with two. All his actions were in combinations of three; at table he asked for three rolls, three helpings of meat, three of cheese, three glasses of wine. He gets three ties, three diaries, three pencils; he writes three letters of three pages, and on one of them, addressed to his sister, he writes her name along with that of her nurse and her dog, to make three.

Another victim was sometimes seized with an irresistible need to bark; if he tried to resist, he felt a gripping sensation at the base of his chest, with a painful point in the epigastric region; he was also in pain with severe irritation of the hands and feet, like electric discharges, he said. As soon, however, as he could bark, in imitation of the yelping of a dog which had once bitten him, he at once calmed down and felt relief. To give satisfaction to this imperious need to bark, and sometimes to laugh and weep without reason, he had hired a room in a hotel at the end of a corridor, and there he relieved and discharged himself, as he said, by barking, sometimes for more than an hour. Although the room was a separate one, he barked so loud that the lodgers complained, and once knocked him about; but in spite of all his efforts he had not been able to cease barking. He had also occasional impulses to tear, to smash, to steal, to say objectionable words; he had also the insanity of doubt, the fear of touching things, and several other phobias.

(1) Magnan—Report, 1906.

HEREDITARY DEGENERATES.

Year.	Men.		Women.		Total.	Detail.									
						Men.					Women.				
						Unbalanced.	Feeble-minded.	Imbeciles.	Idiots.	Total.	Unbalanced.	Feeble-minded.	Imbeciles.	Idiots.	Total.
		%		%											
1892	395	19·26	338	21·35	733	131	175	61	28	395	150	140	31	17	338
1893	406	22·02	299	20·15	705	125	218	43	20	406	132	146	16	5	299
1894	396	19·11	363	21·76	759	129	199	55	13	396	138	183	27	15	363
1895	481	23·67	336	21·22	817	175	231	65	10	481	151	150	20	15	336
1896	471	22·56	367	21·99	838	222	191	48	10	471	179	156	25	7	367
1897	385	20·01	294	20·00	679	138	168	56	23	385	104	138	26	26	294
1898	426	22·53	316	20·60	742	171	188	48	19	426	136	135	26	19	316
1899	458	25·01	304	21·02	762	172	199	60	27	458	124	109	46	25	304
1900	470	25·11	327	22·20	797	186	211	48	25	470	145	124	40	18	327
1901	542	28·36	455	28·12	997	206	219	63	24	542	209	171	38	17	455
1902	584	29·00	521	29·63	1105	239	247	74	24	584	234	210	59	18	521
1903	501	25·70	457	27·71	958	205	222	53	21	501	222	169	42	24	457
1904	614	32·23	534	32·68	1148	234	280	83	17	614	291	187	38	18	534
1905	550	30·52	580	35·43	1130	221	237	55	37	550	317	219	28	16	580
1906	607	32·06	547	33·11	1154	243	279	49	36	607	273	224	32	18	547
1907	680	32·26	560	33·21	1240	299	281	68	32	680	335	172	33	20	560
1908	645	31·30	597	34·43	1242	284	282	50	29	645	301	242	39	15	597
1909	746	35·40	619	35·90	1365	376	308	42	20	746	364	218	21	16	619
1910	665	31·68	641	35·95	1306	273	345	22	25	665	319	288	21	13	641
1911	712	35·25	623	34·59	1335	248	403	34	27	712	259	331	15	18	623

This disbalanced person, despite the number and variety of his complaints, by the very reason of their multiplicity was curable, and was actually cured in a few months at the asylum, although outside he had dragged along a most miserable existence for several years.

Among these degenerates, we have also several cases of persecution-delusions, active and passive, who are very dangerous; notably the patient who fired at Dr. Giles in revenge for the tortures which the doctors had submitted her to; and another woman who said that she had been hypnotised at a distance by Sarah Bernhardt, and had threatened to kill her. The mother of this last person, herself also of unsound mind and very restless, protesting against the segregation of her daughter, had succeeded in gaining to her view two deputies, who, of course misinformed, had begun to take measures to put an end to this so-called arbitrary sequestration. In this group of degenerates we might mention the woman who, under the influence of illusions, insane reasoning, and ideas of persecution, became the murderess of the Abbé of Broglie.

Are these facts rare? Alas, the following statistics will show how frequent are these manifestations of insanity among hereditary degenerates (page 376).

These poor wretches are born with the mark of their parentage on them. Considering the site and spread of their lesions according to the localization of their functional troubles, the clinical types are very variable. But in spite of their diversity it is by insensible transitions that we are conducted from the top to the bottom of the ladder, from the idiot completely fallen from man's estate to the high-class degenerate, intelligent but unbalanced. We have little to say here of the idiot who, in the back-rooms of his spinal cord, mid-brain and hind-brain, lives a purely vegetative or else instinctive existence; peripheral stimuli indeed provoke reflexes from the medulla or brain; but these are only simple reflexes, and the centres of inhibition never come into play. As soon as the frontal region becomes free, the subject begins to enter the region of ideation and control; he ceases then to be an idiot, and is raised to the dignity of an imbecile. The localization of lesions to such and such a perceptive centre, covering a greater or less extent of the anterior region, explains to us that such and such a faculty has survived the shipwreck, and that there are such persons as "partial geniuses," or wise idiots. Among the feeble-minded and unbalanced persons, among whom are found those offenders whose cases are those of mental pathology, the lesions are not of a gross anatomical sort, but functional mischief, on which depend the modifications of the cerebro-spinal activity. With them the prominent factor is the disharmony and lack of equilibrium, not only between the mental faculties and intellectual operations on one side, and the sentiments and leanings on the other, but the further disharmony between the intellectual faculties themselves, and the lack of equilibrium in the world of morals and character. A man

with a hereditary taint may be a savant, a distinguished magistrate, an eminent mathematician, a shrewd politician, an able administrator, and yet from the moral point of view may exhibit profound defects, queer whimsicality, surprising oddities of conduct; and since our moral side, our sentiments and likings, are at the bottom of our overt actions, it follows that the brilliant faculties are put to the service of an ignoble cause; that is to say, of instincts, appetites and sentiments of a low order, which by reason of the failure of will-power drive their subject to the most extravagant, and sometimes the most dangerous actions (1).

We have traced the epileptics who have been admitted from 1880 to 1912 in the following table. The total numbers only give an imperfect account of the extent of the evil. In fact, many of these poor things avoid the asylums, and others only come back after an increase in the number of attacks, or after an access of delirium, often due to their own excess in drink. This last increases the frequency and intensity of the attacks, and gives rise to fits of delirium, apart from which these patients would have been able to continue to work outside, and to follow the treatment prescribed to out-patients (2). When they are temperate, many of them can continue their work outside, and even improve their health (3). This is notably true of women, who owing to their greater general sobriety, can in spite of epilepsy or hysteria continue their occupations, and live without danger in their families; sometimes also their neuroses improve, their crises become more and more rare, and are not accompanied by delirium (4). On the other hand, the number of epileptics who return to the asylum

EPILEPTICS

Admitted from 1880 to 1911.

Years.	Men.	Women.	Total.	Years.	Men.	Women.	Total.
1880	138	50	188	1896	95	77	172
1881	149	48	197	1897	113	83	196
1882	123	62	185	1898	107	66	173
1883	169	99	268	1899	108	70	178
1884	170	80	250	1900	96	64	160
1885	175	91	266	1901	118	77	195
1886	154	68	222	1902	91	64	155
1887	134	59	193	1903	94	96	190
1888	128	81	209	1904	91	73	164
1889	125	72	197	1905	74	50	124
1890	128	59	187	1906	93	66	159
1891	136	47	183	1907	86	71	157
1892	157	42	199	1908	92	73	165
1893	123	58	181	1909	92	75	167
1894	123	51	174	1910	108	72	180
1895	87	70	157	1911	97	71	168

(1) *Infancy of criminals considered in relation to natural predisposition to crime.* Magnan's Report at the Congress of Criminal Anthropology, 1889.

(2) Report Magnan, 1901. (3) Report Magnan, 1904. (4) Report Magnan, 1901.

as a result of fresh excesses has gone up; in 1900, among 160 epileptics (96 male, 64 female) there are counted in this class 51 relapses (39 men, 12 women).

In 1905 the greater part of 124 relapses (74 men, 50 women) have the same origin. In 1911 the epileptics are not less in number than 168 (97 men, 71 women).

A terrible scourge as is alcoholism to the individual whom it drags to asylum, hospital or prison, it is also a heavy burden on society. Who can ever tell the enormous expense which it heaps annually on the community in the establishment and working of the various services; who can tell what capital is lost every year, by reason of stoppages, to agriculture and national industries; how great a part it plays in the deterioration of the race; the suffering which it produces, the tears which it brings? Can one think any longer, without terror, of the dreadful responsibility which drinkers take on their shoulders in face of themselves, Society, and Humanity?

It is the special merit of the Eugenics Congress that it spread such thoughts abroad. And does it not indicate an interesting association of ideas, that one of us, chief physician to the asylum of St. Anne, who previously in England, at the congress of Norwich in 1894, described the influence of alcohol on the race, should long years ago have placed in the same hall where he examines his patients, right in front of them and well in view, an admirable portrait of the great Darwin?

RASSENHYGIENE UND ÄRZTLICHE GEBURTSHILFE.

Dr. Agnes Bluhm.

Berlin-Gross Lichterfelde.

Es ist vielleicht kein Zufall, dass der Erste Internationale Kongress für Eugenik in einem Lande stattfindet, in welchem das Sprichwort zu hause ist "To prevent is better than to cure." Beweist doch dieses Wort, dass man in England seit alten Zeiten den Wert der Prophylaxe zu würdigen weiss, und Heilmittel auf keinem Gebiete überschätzt.

Trotzdem hat sich bisher auch in England, wie in allen Kulturstaaten, die bewahrende Wirkung der Medizin fast ausschliesslich auf die einzelnen Individuen der lebenden Gesellschaft erstreckt. Um das Wohl der Nachkommenschaft hat sich diese Wissenschaft bis her so gut wie garnicht gekümmert; sie fügt im Gegenteil, indem sie die lebende Generation auch in ihren körperlich und geistig schlecht veranlagten Repräsentanten schützt,

den folgenden Generationen mannigfachen Schaden zu. Wenn Sie die Eugenik definieren als " the study of agencies under social control, that may improve or impair the racial qualities of future generations," so nimmt die Medizin unter den Studienobjekten der Eugenik sicherlich einen wichtigen Platz ein. Und innerhalb der medizinischen Therapeutik ist es wiederum die Geburtshilfe, durch welche der Rasse besondere Gefahren drohen.

Gestatten Sie mir deshalb, über die Beziehung der Geburtshilfe zur Rassenhygiene heute einige Worte zu sprechen.

Einer der führenden Geister in der deutschen eugenischen Bewegung, Dr. William Schallmayer, hat vor mehr als 20 Jahren das Wort geprägt: " Je erfolgreicher die Geburtshilfe sich entwickeln wird, desto mehr werden die kommenden Generationen sie nötig haben." Mit anderen Worten, die ärztliche Geburtshilfe vermehrt die Gebärunfähigkeit und bedroht so den Bestand der Rasse.

Lassen Sie uns untersuchen, ob dieses Wort zu recht besteht und wie wir uns aus dem Dilemma retten können.

Sie kennen alle das Bibelwort: " Ich will Dir viel Schmerzen schaffen, wenn Du schwanger wirst. Du sollst mit Schmerzen Kinder gebären " (" I will greatly multiply thy sorrow and thy conception; in sorrow thou shalt bring forth children "). Dieselbe Empfindung, welche vor bald 3,000 Jahren den Autor der Genesis dazu trieb, den Geburtsschmerz als göttlichen Fluch, als Strafe für das übertretene Gebot hinzustellen, beherrscht uns noch heute, nämlich das Gefühl, dass dieser Schmerz etwas *Unnatürliches* ist. Es erscheint uns als etwas Selbstverständliches, wenn uns die Reisenden von den leichten, schmerzlosen Geburten der sog. Naturvölker (primitiven Völker) berichten. Freilich sind diese Berichte, da sie nur zum geringen Teil auf eigener direkter Beobachtung und zumeist auf " Hörensagen " beruhen, mit Vorsicht aufzunehmen, und die Behauptung, dass bei den Naturvölkern die Geburten *keinerlei* Beschwerden machen, bedarf entschieden der Einschränkung. Immerhin kann man sagen, das die Gebärfähigkeit der Kulturvölker im Vergleich zu derjenigen der primitiven Völker eine pathologisch veränderte ist.

Was ist nun diese Veränderung, diese Degeneration zustande gekommen? Wie aus dem Citat der Genesis hervorgeht, muss bei den Juden um das Jahr 850 v. Chr. die schmerzhafte Geburt die Regel gewesen sein. Die Juden besassen damals zwar schon eine relativ hohe Kultur, aber nach den Mitteilungen verschiedener Autoren doch nur eine ziemlich mangelhafte Geburtshilfe. Es kann sich demnach bei ihnen nicht um eine Abschwächung der Geburtsauslese durch erfolgreiche Kunsthilfe und eine daraus folgende häufigere Vererbung verminderter Gebärfähigkeit gehandelt haben. Dass bei dem Zustandekommen der erschwerten Geburten bei den Kulturvölkern noch andere Faktoren stark mitsprechen. darauf weisen auch die Berichte über die Geburten in den verschiedenen Ständen in China hin. Hier

liegt die Geburtshilfe noch heute einzig und allein in den Händen von Hebammen, die mehr Unglück anzurichten als zu verhüten scheinen. Trotzdem gebären die Chinesinnen der höheren Stände viel schwerer und schmerzhafter als diejenigen der niederen. Es erscheint mir wahrscheinlich, dass die grössere Schmerzhaftigkeit der Geburt *z.t.* auf einer grösseren Schmerzempfindlichkeit der Kulturvölker beruht, die wir nicht ohne weiteres als Entartungszeichen auffassen dürfen, denn sie hängt *möglicherweise bis zu einem gewissen Grade* mit der höheren Entwicklung des Nervensystems zusammen, welche die Kulturfähigkeit überhaupt bedingt. Es ist ausserordentlich schwer hier die Grenze zwischen dem " noch Normalen " und dem " bereits Pathologischen " zu ziehen. Auch die längere Geburtsdauer kann *z.t.* auf diese grössere Schmerzempfindlichkeit zurückgeführt werden, insofern als die ersten Wehen, welche zuweilen noch keine eigentlichen Geburts- sondern Schwangerschaftswehen sind, von den Frauen der Naturvölker garnicht als solche empfunden werden. Bei den Kulturvölkern wird durch die Schmerzhaftigkeit solcher Wehen häufig eine lange Geburtsdauer vorgetäuscht.

Ebensowenig wie in dem Geburtsschmerz als solchem dürfen wir in *jedem* Fall, in dem ein gewisses räumliches Missverhältnis zwischen kindlichem Schädel und mütterlichem Becken besteht ohne weiteres ein Dokument der Entartung sehen. Das Dichterwort " Es ist der Geist, der sich den Körper baut," dürfte wohl in dem übertragenen Sinne Geltung haben, dass bis zu einem gewissen Grade die Entwicklung des Gehirns für die Grössenverhältnisse des Schädels massgebend ist. Die grösseren Schädelmassen der Kulturvölker sind vermutlich eine Selektionswirkung langer Zeiträume. Es wäre nun sehr wohl denkbar, dass die weiblichen Becken sozusagen nicht genügend mitgewachsen sind, sich den vergrösserten Schädeln nicht angepasst haben. Eine solche verminderte Anpassung wäre aber keine Entartung Leider fehlt es noch durchaus an genügenden, genauen Messungen der mütterlichen Becken und der Schädel der Neugeborenen bei primitiven Völkern, welche durch Vergleich mit den entsprechenden Massen bei den Kulturvölkern eine Entscheidung der inredestehenden Frage ermöglichen würden. Den Herren " from over the sea," aus dem Westen der V.S.A., aus Canada und Australien erwächst hier eine lohnende Aufgabe. Wenn dem Geburtshelfer die Vorstellung geläufig ist, dass sich die kindlichen Grössenverhältnisse denjenigen des mütterlichen Beckens anzupassen pflegen, und dass bei engen Becken kleine Kinder zu erwarten sind, so spricht dies nicht gegen unsere Hypothese. Denn hier handelt es sich wohl zumeist nicht um eine eigentliche Anpassung, sondern das Kind hat eben die, namentlich mit " allgemein verengtem " Becken zusammentreffende, kleine Statur der Mutter geerbt. Es erlebt denn auch der Arzt, der sich auf diese vermeintliche Anpassung verlässt, nicht selten sehr unangenehme Ueberraschungen, wenn der Vater des Kindes ein grosser Mann ist.

Dieses Beispiel lenkt unsere Aufmerksamkeit auf einen weiteren Faktor, der die Gebärfähigkeit der Völker ungünstig beeinflusst, nämlich die Rassen- bezw. Stammesmischung. Bei Mischlingsgeburten, bei denen der Vater im Verhältnis zur Mutter sehr gross ist, sind auch bei primitiven Völkern (z. B. Vater Aleute, Mutter Kamschadalin) Geburtsstörungen keine Seltenheit. Aber solche Mischlingsgeburten sind eben bei ihnen sehr viel seltener als bei den starkgemischten und in regem Verkehr miteinander stehenden Kulturvölkern. Auch in diesen Fällen können wir nicht eigentlich von Entartung sprechen.

Immerhin bleibt bei Kulturvölkern eine *sehr erhebliche* Zahl von Fällen übrig, in denen es sich um einen pathologischen Geburtsverlauf im eigentlichen Sinne des Wortes handelt. *Es fragt sich nun, inwieweit diese verminderte Gebärfähigkeit individuell erworben sein kann, und inwieweit sie auf erblicher Anlage beruht, in wieweit somit die ärzliche Geburtshilfe ihrer weiteren Vererbung Vorschub leistet?* Denn wenn durch die Kunst des Geburtshelfers eine Mutter mit stark verengtem Becken ein lebendes Kind zu Welt bringt, während sie ohne diese Kunst von einem toten Kinde entbunden worden wäre, so trägt unter der Voraussetzung der Erblichkeit der Beckendifformitäten, der Geburtshelfer zur Verbreitung der engen Becken bei. Wir können nun auf die obige Frage wie auf alle ähnlichen heute keine genaue ziffernmässige Antwort geben. Wir glauben aber sagen zu dürfen, dass die schlechte Gebärfähigkeit *mindestens* ebenso oft ererbt wie erworben wird. Die Gebärfähigkeit ist im wesentlichen von zwei Momenten abhängig, nämlich von der austreibenden Kraft und dem sich ihr entgegenstemmenden Widerstande, oder anatomisch ausgedrückt: von der Beschaffenheit der Gebärmutter- (und Bauch-) Muskulatur einerseits und derjenigen des knöchernen Beckens und des Beckenbodens (perineum) andererseits.

Beide Faktoren können durch eine unzweckmässige Lebensweise, vor allem durch mangelnde Bewegung übermässiges Sitzen oder Stehen ungünstig beeinflusset werden. Der Uterus gehört zwar zu den sog. unwillkürlichen Muskeln, die nicht bewusst geübt werden können wie die willkürliche Muskulatur (Arm-, Bein-, Rücken-, etc., Muskulatur); die Uebung der letzteren bleibt aber nicht ohne Einfluss auf die ersteren. Denn der Zustand der willkürlichen Muskeln ist in hohem Grade vom Blutkreislauf abhängig, der seinerseits wiederum von der Körperbewegung abhängt. Damit mag es zusammenhängen, dass die vornehmen Chinesinnen, die infolge ihrer Fussverkrüppelung zu fast stetem Sitzen verurteilt sind, ebenso wie die Malayinnen und Javanesinnen, die eine vorzugsweise sitzende Lebensweise führen, meist schwere Entbindungen haben. Köttnitz, der die Gesundheitsverhältnisse der sächsischen Industriearbeiterinnen studierte, sah das sog. "platte Becken" häufiger bei Frauen, die als Kind keine Rachitis gehabt hatten, aber mit 14 Jahren in Webereien eingetreten waren,

wo sie anhaltend stehen mussten. Dies spricht dafür, dass auch das knöcherne Becken indirekt durch die Lebensweise beeinflusst wird.

Andererseits steht es unzweifelhaft fest, dass sowohl das knöcherne Becken als auch der muskulöse Gebärapparat (wie das gesamte Muskelsystem) von erblichen Einflüssen abhängig sind. Wir kennen in Deutschland ganze Landstriche, in denen wegen der mangelnden Nachgiebigkeit der Muskulatur sehr häufig die Zange angelegt werden muss. Seitz schätzt den Verlust an Kindesleben, den Deutschland jährlich durch " primäre Weichteilschwierigkeiten " erleidet, auf 16,000 = 25% sämtlicher Totgeburten. Da nun die Geburtshilfe gerade diese Schwierigkeiten am leichtesten zu überwinden imstande ist, so geht aus diesen Zahlen hervor, wie stark verbreitet dieselben in Deutschland (und vermutlich auch in den anderen Kulturländern) sind.

Die Häufigkeit des engen Beckens wird für Deutschland auf 14-20% aller Mütter geschätzt. Solche Grade von Beckenenge, welche *erhebliche* Geburtsstörungen bedingen, werden nach *Sonntag* in 3-5% aller Geburten getroffen. Da das Material, das diesen Zahlen zu grunde liegt, den Entbindungsanstalten und Polikliniken entstammt, also eine ungünstige Auslese aus der Bevölkerung darstellt, so dürften die ersteren für das ganze Volk etwas zu reduzieren sein. Immerhin bleiben sie hoch genug. Dass das sog. " allgemein-verengte " Becken auf Erblichkeit beruht, ist über jeden Zweifel erhaben. Für das infantile ist Erblichkeit wahrscheinlich. Beide machen zusammen in Deutschland (in der Marburger Gegend) nach Ahlfeld mehr als 1/3 sämtlicher Beckendifformitäten aus. Weitere 55-60% der letzteren beruhen auf Rachitis. Da man nun heute, gestützt auf eine Reihe beweiskräftiger Tatsachen annimmt, dass die *Disposition* zu Rachitis vererbt wird, so dürfen wir sagen, dass bei mindestens 90% der durch das knöcherne Becken bedingten Geburtshindernisse die Erblichkeit eine Rolle spielen kann. Hieraus geht hervor, in wie weitem Umfang eine kurzsichtige ärztliche Geburtshilfe, die in *allen* Fällen unterschiedslos die Erhaltung nicht nur des mütterlichen, sondern auch diejenige des kindlichen Lebens als ihre Aufgabe betrachtet, imstande ist, zur zunehmenden Verschlechterung der Gebärfähigkeit beizutragen.

Wie die gesamte Chirurgie so hat auch die Geburtshilfe mit der durch Ihren berühmten Landsmann, Lord Lister, eingeführten Antisepsis einen enormen Aufschwung genommen. Ich habe versucht an der Hand der Cadischen Statistik festzustellen, ob seit dieser Zeit bereits eine Abnahme der Gebärfähigkeit bemerkbar ist. (Tafel.) Dass die Zahl der Operationen von 4.38% der Geborenen in den Jahren 1871/79 auf 8.12% in den Jahren 1900/07 gestiegen ist, das wäre an sich kein Beweis dafür; denn die Zahl der Operationen ist in hohem Grade von der Zahl der Aerzte abhängig, und diese hat sich in dem betreffendem Zeitraum beträchtlich vermehrt.

Beweisender ist das Wachstum einzelner Operationsarten. Um bei starkem Missverhältnis zwischen mütterlichem Becken und kindlichem Schädel die Anbohrung (*Perforation*) oder Zerstückelung des Kindes (*Embryotomie*) zu vermeiden, wird häufig vor dem normalen Schwangerschaftsende d.h. in einer Zeit, in welcher das Kind zwar lebensfähig ist, sein Schädel aber noch nicht den vollen Umfang erreicht hat, die sog. künstliche Frühgeburt eingeleitet. Künstliche Frühgeburt einerseits und Perforation und Embryotomie andererseits sind also zwei Operationsarten, welche sich gegenseitig ausschliessen. Steigt die Zahl der Frühgeburten, so sollte die Zahl der Perforationen und Embryotomieen fallen. Steigen beide, so deutet das mit Notwendigkeit auf eine Zunahme der Gebärunfähigkeit. Letzteres hat nun im Grossherzogtum Baden tatsächlich stattgefunden. Die künstlichen Frühgeburten haben sich seit 1871-79 verachtfacht, die Perforation verdreifacht und die Embryotomie verdoppelt; dabei ist die Zahl der Kaiserschnitte, welche zumeist ja auch die Perforationen und Embryotomieen vermeiden sollen, um das neunfache gewachsen. Die Verschlechterung der Gebärfähigkeit der Badenserinnen kann aber keine sehr grosse gewesen sein; denn die fehlerhaften Kindeslagen, welche gleichfalls der Ausdruck eines pathologischen mütterlichen Gebärapparates (insbesondere des Beckens) sind, haben mit Ausnahme der Querlagen, die etwas im Zunehmen begriffen sind, eher, ab– als zugenommen. Voraussichtlich wird sich aber das Bild im Laufe der nächsten Jahrzehnte ändern; denn erst dann kommt die Mehrzahl der Töchter jener gebäruntüchtigen Frauen zur Entbindung, denen die Fortschritte der operativen Technik das Gebären lebender Kinder und damit die erbliche Uebertragung ihrer Unfähigkeit ermöglicht haben.

Deutlicher als die Badener Zahlen sprechen die Hamburger für eine zunehmende Gebäruntüchtigkeit. Trotzdem die Fortschritte der operativen Technik die Prognose für Mutter und Kind im allgemeinen von Jahr zu Jahr günstiger gestalten, nimmt in Hamburg seit einiger Zeit die Sterblichkeit der Mütter bei den operativen Geburten zu. In 100 der Operation ist sie von 3'30% im Jahrfünft 1895/99 auf 4.80% in 1900/04 und 5.21% in 1905/09 gesitegen. Im Verhältnis zur Zahl der Niederkünfte uberhaupt hat sie schon seit 1885/89 kontinuierlich von Jahrfünft zu Jahrfünft zugenommen. Die kindlichen Todesfälle haben in 100 der Operationen zwar abgenommen, in 100 der Geborenen überhaupt sind aber auch sie seit 1885/89 kontinuierlich gestiegen. In 1885/89 betrugen sie $10{\cdot}70^0/_{00}$ der Geborenen, 1905/09, $13'65^0/_{00}$. Die Operations frequenz ist im gleichen Zeitraum von 4.74% der Niederkünfte auf 7.49% gestiegen. Aus diesen Zahlen geht hervor, dass in Hamburg die Fortschritte der Geburtshilfe schon nicht mehr mit der Verschlechterung der Gebärfähigkeit Schritt halten und deren üble Folgen ausgleichen können. Sie zeigen aufs deutlichste die Gefahr, welche der Rasse aus der durch die vermehrte Geburtshilfe bewirkten Einschränkung der Auslese erwächst.

Die ärztliche Geburtshilfe beeinflusst nun aber nicht nur die Gebärfähigkeit der folgenden Generation, sondern sie besitzt noch weitere Wirkungen, die für den Bestand der Rasse von Bedeutung sind.

Es ist unzweifelhaft, dass eine zu lange Geburtsdauer die Lebensfähigkeit der Früchte beeinträchtigt. Schon die normale Geburt bedingt eine starke Bedrohung des kindlichen Lebens. Verzögert sich der Akt durch herabgesetzte Gebärfähigkeit der Mutter, so kann selbst eine Frucht von normaler Widerstandsfähigkeit demselben erliegen. Ja, besonders kräftig entwickelte Kinder, die häufig als solche die alleinige Ursache der Verzögerung sind, erscheinen besonders gefährdet. Hier schützt die Abkürzung der Geburt durch ärztlichen Eingriff die Rasse nicht nur vor quantitativem, sondern auch vor qualitativem Verlust, auch bei normaler mütterlicher Gebärfähigkeit d.h. ohne einer Vermehrung der Gebäruntüchtigkeit Vorschub zu leisten.

Auf der anderen Seite wird durch bestimmte operative Eingriffe der kindliche Körper, insbesondere der Schädel zuweilen erheblichen Verletzungen ausgesetzt, die zwar nicht zum sofortigen Tode führen, aber doch schnere Störungen der betroffenen Organe, namentlich des Gehirns mitsich bringen können. In welchem Umfange dies tatsächlich stattfindet, darüber ist man heute noch nicht ganz einig. Nach neueren Untersuchungen scheint die Bedeutung der Geburtsverletzungen für die Entstehung der Geisteskrankheiten nicht so gross zu sein, als man eine Zeit lang anzunehmen geneigt war. Immerhin konnte ich aus den Krankengeschichten der 215 Patienten, welche sich im Frühjahr 1905 in der schweizerischen Anstalt für Epilektiker und Idioten bei Zürich befanden 11 Zangengeburten feststellen. (7 mal hatten dabei deutliche Schädelverletzungen stattgefunden.) Es ist dies ein Prozentsatz von 5,1, der den üblichen von 2-3% erheblich übersteigt.

Auffallend war mir in der gleichen Anstalt der hohe Prozentsatz der Frühgeburten (7%). Diese Beobachtung scheint mir für die Beurteilung der künstlichen Frühgeburt in ihrer Bedeutung für die Rasse nicht unwichtig zu sein. Man könnte nämlich a priori meinen, dass abgesehen von der Möglichkeit, die Gebärunfähigkeit zu vererben, diese Operation vom Standpunkt der Eugenik durchaus zu billigen sei. Denn die frühgeborenen Kinder sind ja einer viel stärkeren Auslese unterworfen als die rechtzeitig geborenen, und nur die widerstandsfähigen bleiben am Leben. Leider wissen wir fast garnichts über deren späteres Schicksal. Sollte es sich bestätigen, dass sie geistigen Störungen in grösserem Umfang unterworfen sind als die rechtzeitig Geborenen, so wäre im Interesse der Rasse die künstliche Frühgeburt aus der ärztlichen Geburtshilfe zu verbannen.

Beachtenswert erscheint mir auch das häufige Vorkommen von Rachitis bei den Insassen der Irrenanstalt zu Klingenmünster in der Rheinpfalz, das ich aus den Krankengeschichten feststellen konnte, und zwar um so mehr, als in der Pfalz das Selbststillen, welches der Rachitis entgegen-

wirkt, sehr verbreitet ist. Da die Geburtshilfe, wie wir sahen, die Verbreitung der Rachitis begünstigt, so würde sie auch auf diesem Umwege der Entstehung von Geisteskrankheiten Vorschub leisten. Es bedarf indessen noch grösserer Beobachtungsreihen, als bisher vorliegen, um den betreffenden Zusammenhang zu beweisen.

Wir kommen nun zu der Frage: *wie können wir verhindern, dass die Geburtshilfe der Rasse immer von neuem und in wachsendem Masse Schaden zufügt?* Im Hinblick auf die uns allen in Fleisch und Blut übergegangene Humanität ist es völlig ausgeschlossen, dass wir jemals der weiteren Ausbreitung der Geburtshilfe eine Schranke setzen. Die Vorstellung, dass gebärunfähige Frauen aus Mangel an ärztlicher Hilfe elend zugrunde gehen müssen, ist für unsere Menschenwürde tief verletzend. Wir müssen deshalb auf andere Mittel sinnen, um den Gefahren, die der Rasse aus der vermehrten Geburtshilfe erwachsen, vorzubeugen. Das beste wäre natürlich, wenn die gebäruntüchtigen Frauen *von vornherein* auf Nachkommenschaft verzichten würden. Vereinzelt kommt dies bereits vor; ob es aber je in grösserem Umfang zu erreichen sein wird, das erscheint mir zweifelhaft. Das würde nur möglich sein, wenn wir diesbezügliche gesetzliche Ehebeschränkungen besässen. Dabei wäre zu bedenken, dass die Gebäruntüchtigkeit bereits so stark verbreitet ist, dass einzelnen Völkern aus solchem umfassenden Ausschluss ein bedenklicher quantitativer Verlust erwachsen würde, der nur dadurch ausgeglichen werden könnte, dass die gebärtüchtigen Frauen um so mehr Kinder in die Welt setzen. Zur Zeit aussichtsreicher erscheint mir folgende Massregel: Wie wir sahen, ist es zumeist nicht die Abnormität des Gebärapparates, sondern nur die Disposition zu derselben, welche vererbt wird. Es müssen noch äussere Schädlichkeiten hinzukommen, um die letztere zur Abnormität zu entwickeln. Wir müssen deshalb bestrebt sein, einer solchen Entwicklung vorzubeugen. Wieweit dies hinsichtlich einer ungünstigen Anlage des Muskelsystems möglich ist, kann heute noch nicht mit Sicherheit beantwortet werden. Einen gewissen Erfolg dürfte eine vernünftige Lebensweise auch hier haben. Jedenfalls können wir, und das scheint mir im vorliegenden Fall besonders wichtig zu sein, in weitem Umfang verhindern, dass sich aus der Disposition zu Rachitis eine wirkliche schwere Rachitis mit Beckendifformität entwickelt. Brustnahrung und sonnige, luftige Wohnungen vermögen hier viel zu tun. Das dürfen wir natürlich nicht dabei vergessen: Wenn es uns auch auf diese Weise gelingt zu verhindern, dass die Tochter einer gebärunfähigen Frau selbst gebärunfähig wird, so bedeutet das nicht eigentlich eine Rassen*verbesserung*. In den Keimzellen dieser Töchter ist die Disposition zur Rachitis wahrscheinlich ebenso enthalten wie in denjenigen ihrer Mutter, und ihre Kinder laufen Gefahr ebenso rachitisch zu werden wie die Grossmutter. Immerhin ist, wie aus unseren obigen Bemerkungen hervorgeht, auch der Rasse schon damit gedient, wenn die Entwicklung der Rachitis und die

damit verbundene Gebärunfähigkeit verhindert wird. Es ist auch nicht ausgeschlossen, dass im Laufe von Generationen eine Regeneration des Keimpalasmas eintritt, wenn es gelingt fortgesetzt die Entwicklung der Rachitis zu verhindern. Das eingehende Studium der Rachitis, deren eigentliches Wesen wir trotz der reichen Literatur noch nicht kennen, ist eine wichtige Aufgabe der Eugenik.

Den Hauptnachdruck werden wir bei unseren Bemühungen, den üblen Folgen der Geburtshilfe vorzubeugen, auf die Belehrung der Geburtshelfer legen müssen. Der Senior der deutschen Geburtshelfer Hegar sagt mit Recht, dass keine einzige medizinische Disziplin sich bisher so wenig um die Prophylaxis gekümmert hat, wie gerade die Geburtshilfe. Der heutige Geburtshelfer denkt nur an den Augenblickserfolg. Er berichtet mit Stolz, wenn er eine verkrüppelte Idiotin durch Sectio caesarea von einem lebenden Kinde entbunden hat. Er streitet in Wort und Schrift darüber, ob eine Mutter, falls die Geburt eines lebenden Kindes nur durch eine ihr eigenes Leben bedrohende Operation herbeigeführt werden kann, berechtigt ist, diese Operation zu verweigern, und vergisst vollständig, dass in einem solchen Fall das Kind für die Nation zumeist eine Schädigung und keinen Gewinn bedeutet. Wir müssen das *Rassegewissen* des Geburtshelfers zu wecken suchen. Er darf nicht mehr blindlings danach streben, der Mutter ein lebendes Kind zu verschaffen, sondern er muss sich im einzelnen Falle fragen, ob er auch der Rasse gegenüber die Verantwortung dafür übernehmen kann. Nur, wenn ein anderer, eugenischer Geist in die Geburtshilfe einzieht, wird sie der Rasse zum Segen und nicht zum Fluche werden. Ist der Geburtshelfer von eugenischem Geiste durchdrungen, so kann gerade er mehr als mancher andere zur Verbreitung dieses Geistes in breiteren Volksschichten beitragen und dazu verhelfen, dass das Zarathustra-Wort Friedrich Nietzsche's über die Ehe, Allgemeingut seines Volkes wird, nämlich: "Ehe; so heisse ich den Willen zu Zweien, das Eine zu schaffen, das mehr ist, als die es schufen."

EUGENICS AND OBSTETRICS.

Dr. Agnes Bluhm.

It is, perhaps, no mere chance that the first International Eugenics Congress is being held in a country in which it is a household word that "to prevent is better than to cure." This proverb shows that the value of preventive medicine has been recognised in England from old times, and that that of remedial medicine has been in no way over-estimated.

In spite of this, in England, as in all civilized States, the science of medicine has, up to the present time, confined its activities almost entirely to

single individuals of its own generation. This science has hardly concerned itself at all with the well-being of future generations; on the contrary, it is bringing to these future generations many evils by its protection of those people who are at present physically or mentally unsound.

If we define Eugenics as "the study of agencies under social control that may (improve or) impair the racial qualities of future generations," the science of medicine surely takes an important place among the subjects to be studied, and among the branches of therapeutics it is Obstetrics through which especial dangers threaten the race.

Permit me, therefore, to speak a few words to-day on the relation between Obstetrics and Eugenics.

One of the leading spirits of the German Eugenics movement, Dr. Wilhelm Schallmayer, more than 20 years ago, uttered the following words, "The more successfully Obstetrics develops, the more necessary will it become for future generations."

In other words, Obstetrics increases the inability to bear children, and so threatens the continuance of the race.

Let us inquire whether this saying holds good, and how we can escape from the dilemma.

You all know the Bible saying: "I will greatly multiply thy sorrow and thy conception; in sorrow thou shalt bring forth children." The same feeling which, almost 3,000 years ago, caused the author of Genesis to regard the pains of childbirth as a divine curse—a punishment for broken laws—rules us to-day, namely, the feeling that this pain is unnatural.

It appears to us a matter of course when travellers inform us of the easy, painless labour of the so-called primitive races. Doubtless this information must be received with reservations, since it is founded only to a small extent on their own direct observations and mostly on "hearsay"; and the statement that among primitive peoples childbirth brings no kind of troubles must be decidedly modified. At the same time, it may be said that the ability for bearing children among the civilised races, as compared with that of the primitive peoples, is pathologically altered.

How has this alteration—this degeneration—come about?

According to the quotation from Genesis, painful labour must have been common among the Jews about the year 850 B.C. It is true that the Jews had, at that time, already attained to a relatively high state of culture, but according to the information of different authors, they possessed only a rather inadequate knowledge of midwifery.

There can, therefore, have been no question among them of any weakening of the power of delivery, through artificial assistance, and of the consequent frequent transmission of a decreased ability to bear.

That, among the causes of more difficult labour among civilized races, other factors have a place is shown by information about the births in the different ranks of society in China. There the help in confinements is still

altogether in the hands of midwives, who seem to do more harm than good.

In spite of this, the Chinese women of the higher ranks bring forth children with much more difficulty and pain than those of the lower ranks.

It seems probable to me that the greater painfulness of childbirth depends in part on the greater sensibility of civilised people to pain, which we must not, without further consideration, put down as a sign of degeneracy, for it is connected, possibly to a considerable degree, with the higher development of the nervous system, which is generally a condition of a capacity for culture. It is very difficult here to draw the line between the "normal" and the "pathological." The longer duration of labour can also, in part, be traced to this greater sensibility to pain, in so far as the first pains, which sometimes are not real labour pains but pains of pregnancy, are not, as such, felt by the women of uncivilised races. Among civilised races the painfulness of these throes often leads to the delusion that labour is prolonged.

Just as little as in the case of painful labour, should we, without further consideration, attribute to degeneration every case in which there is a certain want of unity in measurement between the child's skull and the mother's pelvis.

The poet's word, "It is the mind which forms itself a body," may be true in another sense, in that, to a certain extent, the development of the brain decides the size of the skull. The greater skull measurements of the civilised races are probably the outcome of "selection" through long periods of time. It is quite possible that the female pelvis has not increased in proportion, and has not accommodated itself to the enlarged skulls.

Such a lessened adaptation is not degeneration. Unfortunately, there are not in existence enough exact measurements of the maternal pelvis and the skulls of the newly-born among primitive races to make it possible for us, through comparison with a similar number of cases among the civilized races, to arrive at a decision on this point. To our fellow workers "from over the seas"—from the Western States of America, from Canada, and from Australia—there is here presented a study which will repay them. Even though, to the obstetrician, the idea is familiar, that the measurements of the child and those of the mother's pelvis usually agree—that with a small pelvis a small child is to be expected—this does not prove anything against our hypotheses.

For here we are not concerned chiefly with an exact adaptation but with the fact that the child has only inherited from its mother the small stature generally associated with a small pelvis.

The physician who relies on this presumed agreement frequently receives a disagreeable surprise when the father of the child is a big man.

This example draws our attention to another factor which influences unfavourably the capacity for bearing children among the nations, namely, the unavoidable mixing of breeds.

In mixed births, in which the father is very big in comparison to the mother, troubles in labour are of common occurrence, even among primitive peoples (for example: father, Aleutian; mother, Kamschadale).

But such mixed births are much less frequent among them than among civilized races, who through their constant intercourse with each other become closely connected. In these, again, we cannot properly speak of degeneration.

Nevertheless, there remain among civilized races a very considerable number of cases in which a pathological course of delivery, in the true meaning of the phrase, comes into the question.

The question now is: how far this lessened ability to bear can be individually acquired, and how far it depends upon inherited predisposition. How far, consequently, medical assistance in confinements assists in its further transmission.

For when through the skill of the obstetrician a mother with a much contracted pelvis brings a living child into the world, while without this skill she would have been delivered of a dead child, then, presuming that deformities of the pelvis are transmissible, the obstetrician contributes towards the spread of the contracted pelvis.

We can to the foregoing question, as to all similar questions, at present give no answer borne out by figures; we feel justified in saying, however, that the defective power of bringing forth children is at least as often inherited as acquired. The power of bearing depends essentially upon two forces, namely, the power of expulsion and the resistance opposed to it—or expressed anatomically on the condition of the muscles of the uterus and abdomen on the one hand and that of the bony pelvis and of the perineum on the other. Both factors can be influenced unfavourably through an unsuitable mode of life, above all, through insufficient exercise and through too much sitting or standing.

The uterus belongs, it is true, to the so-called "involuntary muscles," which cannot be knowingly used like the "voluntary muscles" (arm, leg, back muscles, etc.). The exercise of the latter is, however, not without influence on the former, and the condition of the voluntary muscles depends to a great degree upon the circulation of the blood, which, for its part, depends again upon the movement of the body.

It is in accordance with this that the aristocratic Chinese women, who, in consequence of their "foot-crippling," are doomed to almost constant sitting, as well as those women of Malay and Java, who lead sedentary lives by preference, mostly have difficult confinements. Köttnitz, who studied the conditions of health of the industrial women-workers of Saxony, saw the so-called "flat pelvis" most frequently among women who had had no rickets as children, but had entered weaving mills at fourteen years of age, where they had been obliged to stand continuously.

This upholds the idea that the bony pelvis can also be influenced by the manner of life.

On the other hand, it is undoubtedly true that the bones of the pelvis, as well as the "muscular bearing apparatus" (like the whole muscular system), are under the influence of heredity.

We know whole districts in Germany in which, owing to the want of muscular suppleness, forceps must be used.

Seitz values the annual loss of child life which Germany suffers through "primary difficulties" of this kind as 16,000—25% of the total number of stillbirths. Since Obstetrics can overcome just these difficulties most easily these figures show how widespread they are in Germany (and presumably in other lands). The frequency of the contracted pelvis in Germany is reckoned as 14—20% of all mothers; the contractions of the pelvis which are sufficient to bring about important difficulties in delivery are estimated by Sonntag as 3—5%. Since the material which supplies these figures comes from "Lying-in Institutions" and "Cliniques," and represents an unfavourable selection from the population, they should be somewhat reduced for the whole nation.

Nevertheless, they remain high enough. That the so-called "generally contracted pelvis" depends upon inheritance is proved beyond doubt. For this "infantile," inheritance is doubtless also responsible.

Both together account, according to Ahlfeld, in the neighbourhood of Marburg, in Germany, for more than one-third of the total deformities of the pelvis.

A further 55 to 60% of the latter depend upon rickets.

Since we, to-day, hold the belief, which is supported by an array of facts capable of proof, that the disposition to rickets is transmitted, we may say that in at least 90% of the hindrances to birth, brought about through the pelvis, heredity plays a part.

Hence we see to what a great extent short-sighted Obstetrics, which, in all cases, considers as its duty the indiscriminate preservation not only of the maternal but also of the infant life, may contribute to the increasing degeneration of the power to bear children.

Like every branch of surgery, Obstetrics has gained an enormous impetus through antisepsis, discovered by your famous countryman, Lord Lister.

I have sought to find out from Badensian statistics whether, since this, a diminution of the ability to bring forth is noticeable.

That the number of operations has increased from 4.38% of births in the years 1871 to 1879 to 8.12% in the years 1900 to 1907 would be in itself no proof of this, for the number of operations depends to a great extent on the number of medical men, and this has considerably increased in the period concerned. The growth of special operations gives a better proof. When there is a great disproportion between the pelvis of the mother and the skull of the child, in order to avoid perforation or embryotomy (dismemberment

of the child), an artificial premature birth is often brought on before the end of the normal pregnancy, *i.e.*, at a time when the child is indeed (capable of) living, but its skull has not yet reached the full circumference.

Artificial premature birth on the one hand and perforation and embryotomy on the other are therefore two species of operations, one precluding the other. If the number of premature births increases, the numbers of perforation and embryotomy should fall.

If both rise, that points of necessity to an increase in the inability to bear. The latter has taken place as a matter of fact in the Grand Duchy of Baden. Since 1871 to 1879 artificial premature births have increased eight-fold, perforation three-fold, and embryotomy has doubled; moreover, the number of Caesarian sections, which are generally intended to avoid perforation and embryotomy, have increased nine-fold.

The deterioration in the ability for bearing among the women of Baden can, however, not have increased much, for the cases of faulty position of the child, which is also the outcome of a pathological maternal "bearing apparatus" (especially of the pelvis) have, with exception of the transverse position (which is slightly on the increase), rather decreased than increased.

It may be foreseen that the case will be altered in the next decade, for then most of the daughters of those unfit women to whom the advances of operative technique made possible the bearing of living children, and therewith the transmission of their unfitness, will themselves come to bear children.

More plainly even than the Baden figures, those of Hamburg show an increasing unfitness for bearing. Notwithstanding that through the advances of operative technique, a prognosis from year to year more favourable to mother and child may be formed, the death-rate of mothers in Hamburg in operations has been increasing for some time.

In 100 operations it has risen from 3.30 in the years 1895 to 1899, to 4.80 in 1900 to 1904, and 5.21 in 1905 to 1909.

In relation to the number of confinements in general it has, since 1885 to 1889, increased every five years.

The death-rate of infants per 100 instrumental births has, indeed, decreased; in 100 of the births in general it has, however, steadily risen since 1885-89.

In 1885 to 1889 it amounted to 10.70% births, 1905 to 1909. to 13.65%.

The frequency of operations has risen during the same period from 4.74% to 7.49% of the confinements.

It can be inferred from these statistics that in Hamburg the progress of Obstetrics no longer keeps pace with the decrease in the power of bearing, nor can it compensate for the evil effects. They show most plainly the danger which is threatening the race through the limitation of "selection" (fitness) caused by the increase of artificial help at birth. Obstetrics not only influences the capacity for bearing of future generations, but possesses

still further effects which are of signification for the continuance of the race.

It is undoubted that a too prolonged labour is prejudicial to the vital power of the child. Even a normal birth presents great dangers to a child's life.

If the act is delayed through the diminished capacity of the mother, even a child with a normal power of resistance may succumb to it.

Indeed, specially well-developed children who frequently, as such, are the cause of the delay, appear to run especial risks.

Here the shortening of the labour through medical intervention, even though there is a normal natural ability to bear, protects the race, not only from a loss of numbers, but from a loss of quality, without furthering the increase of unfitness to bear.

On the other hand, sometimes considerable injuries result through surgical intervention to the child's body, particularly to the skull, which, though they do not lead to immediate death, may bring with them great disturbances to the affected organ, particularly to the brain. People are not at the present time agreed as to how great an extent this takes place as a matter of fact.

According to the latest investigations, the significance of injuries at birth for the origin of mental diseases appears not to be so great as it was formerly supposed to be.

Nevertheless, I could substantiate 11 instrumental births (by forceps) among the histories of 215 patients who, in the spring of 1905, were in the Swiss Institution for Epileptics and Idiots at Zurich. (Distinct injuries to the skull had taken place in seven cases.) This is a percentage of 5.1, which considerably surpasses the usual one of 2-3%. The high percentage of premature births in the same institution (7%) was very striking.

This observation appears to me to be not unimportant in judging of the significance for the race of artificial premature births.

One might think at first sight that, apart from the possibility of the transmission of inability to bear, this operation might be altogether approved from the standpoint of eugenics.

For premature children have to undergo a much more drastic "process of selection" than those born at the right time, and only those who are able to withstand remain alive. Unfortunately, we know almost nothing of their later fate.

Should it be proved that they are subjected in a greater degree to mental disturbances than those born full-term, then artificial premature births should, in the interests of the race, be forbidden to Obstetrics.

The frequent appearance of rickets among the inmates of the lunatic asylum at Klingenmünster, in the Palatinate of the Rhine, appears to me worthy of notice—(this I was able to substantiate from their histories)—so much the more because in this province breast feeding, which militates against rickets, is very extensive.

Since Obstetrics, as we said, favours the spread of rickets, it would in this way also lend assistance to the origin of mental diseases, but we should require closer observations than those hitherto obtained to prove indisputably the foregoing conclusions.

We come now to the question: How can we prevent Obstetrics from bringing injury to the race constantly, and in ever-increasing degree?

From the point of view of common humanity, it is altogether out of the question that we should ever set bounds to the further spread of Obstetrics. The idea that women who are incapable of natural delivery must perish miserably for want of medical assistance is insulting to our dignity as human beings.

We must, therefore, think of other means in order to obviate the dangers which are growing for the race from the increase of the science of Obstetrics.

The best would, of course, be that women who are unfitted for bearing should, from the very beginning, renounce the idea of descendants.

This already takes place in isolated cases—it appears to me doubtful that it will ever be attained to in any great degree. It would only be possible if we possessed legal limitations of marriage with this in view.

It would then have to be taken into consideration that unfitness to bear is already so widespread, that individual nations would suffer from such a comprehensive exclusion, an important numerical loss, which could only be compensated for by women fit to bear bringing more children into the world.

The following methods appear to me more adapted to the present time: As we said, it is mostly not the abnormality of the "bearing apparatus," but only the predisposition which is transmitted—increased injury must come from outside sources to develop this predisposition into abnormality.

We must, therefore, occupy ourselves with the prevention of this development. How far this is possible with reference to an unfavourable condition of the muscular system cannot be answered with certainty to-day—a sensible mode of life might have a certain amount of effect.

At any rate we can (and this seems to me to be of special importance in the case) prevent to a great degree a predisposition to rickets from developing into really bad rickets with deformities of the pelvis.

Breast-feeding and sunny, airy dwellings can here do much.

At the same time, it must not be forgotten that if we succeed in this way in preventing the daughter of a woman inadapted to bear children from herself becoming inadapted, that does not, of itself, denote an improvement in the race.

In the germ cells of this daughter the disposition to rickets probably exists as strongly as in those of her mother, and her children run the risk of becoming as much affected by rickets as their grandmother.

Nevertheless, as is proved by the foregoing observations, the race is benefited when the development of rickets and the inadaptability for bearing associated with it, is prevented.

It is also not out of the question that, in the course of generations, a regeneration of the "germ plasma" may come about if continued success is maintained in preventing the development of rickets. The comprehensive study of rickets, the real nature of which we do not yet know, in spite of a plentiful supply of literature on the subject, is an important task for Eugenists.

In our efforts to avoid the ill-effects of Obstetrics, we must lay the chief emphasis on the instruction of the obstetrician.

The chief of the German obstetricians, Hegar, says with truth that no single branch of the medical profession has so far troubled itself so little about prophylaxy as has Obstretrics.

The present day obstetrician considers only the effect of the moment. He announces it with pride when he has delivered, by a Caesarian section, a crippled imbecile of a living child. He discusses in word and writing whether a mother, in case the birth of a living child can only be brought about by means of an operation threatening her own life, is justified in refusing that operation, and altogether forgets that in such a case the child generally means a loss to the nation instead of a gain.

We must seek to awaken the "race conscience" of the obstetrician. He must no longer blindly seek to produce for the mother a living child, but must ask himself, in individual cases, whether he can take the responsibility as regards the race.

Only when a different, a Eugenic, spirit influences Obstetrics, will it become a blessing and not a curse to the race.

If the obstetrician is permeated by the spirit of Eugenics, then he, more than any other person, can contribute to the diffusion of this spirit among broader strata of the peoples, and bring it to pass that the saying of Friedrich Nietzsche about marriage may become the universal blessing of his nation—

"Marriage, so name I the will of two, to call into existence one, who is more than they who called him into existence!"

THE PLACE OF EUGENICS IN THE MEDICAL CURRICULUM.

By H. E. JORDAN

(Chairman of the Eugenics Section of the American Association for the Study and Prevention of Infant Mortality).

If the possibilities now exist for developing a physically, mentally and morally stronger and healthier race, true social progress demands that such end be quickly achieved. The possibilities undoubtedly do exist; and the need for racial improvement is urgent. The ultimate ideal sought is a perfect society constituted of perfect individuals. Logically, and from the higher viewpoint, it is more desirable to be able to prevent the production of social inferiors than to raise such elements to physical, mental and moral par. Social therapy is economically much more expensive than social prophylaxis.

Modern medicine, yielding to the demands of real progress, is becoming less a curative and more a preventive science. From an art of curing illness, it is becoming a science of health. It is safe to predict, I believe, that in several centuries medical men generally will be more of the order of guardians of the public health than doctors of private diseases. This represents the medical aspect of the general change from individualism to collectivism. Medicine, in many of its present phases, notably the more purely therapeutic, will be greatly altered. Its surgical and obstetrical phases, however, will become only relatively less important.

It would seem that the sooner this high end be realized the better for all concerned; and the greater the economic saving. Eugenic conduct is undeniably a factor in attaining the speedy achievement of the end of racial health. The status of the medical situation, accordingly, seems to be this: Medicine is fast becoming a science of the prevention of weakness and morbidity; their permanent not temporary cure, their racial eradication rather than their personal palliation. Not that the latter ends be not accomplished wherever and whenever cause requires, and as effectively as at present, but merely as incidental to the greater endeavour in the interests of the race. Eugenics, embracing genetics, is thus one of the important disciplines among the future medical sciences. The coming physician must have adequate training in matters relating to heredity and eugenics. And the medical curriculum that includes these subjects (properly combined as one) and provides for their clear scientific presentation is, other things being equal, the one which best meets the needs of the very near future. For, as the general population becomes better educated in matters of personal and racial health and hygiene, it will more and more demand help along these lines and such advice regarding the prevention of weakness in themselves and their offspring. The physicians are logically the men who must supply the information and give the help sought.

It would thus come within the range of this new-type physician's duties, for example, to give advice to conscientious prospective parties to the marriage contract respecting their physical fitness for this state, the possible nature of resulting offspring, and the desirability or value of such offspring from the standpoint of the race. Again, he might be expected to be informed regarding the racial effect of parental labour in certain industrial occupations, and give advice according to the varying conditions. Or, again, he might be expected to do so apparently simple a thing as to give advice concerning what one should eat in specific instances for the welfare of himself and even his offspring. The future physician must also take a more active part in helping to shape legislation in the interests of race-welfare, especially as regards registration, isolation, and marriage restriction of the venerealy diseased.

The doctor must be able to supply properly what his clientele demands. Hence, for a second reason, the future medical curriculum must include a course in sound eugenics. Pressure will come to bear from without and from within. Incidentally, this new demand will appreciably raise the general moral level of the medical profession. For the responsibility of this altered profession is enormous. Moreover, precept will have value only as it is re-enforced by example. It demands exceptional men to be able to practice in their private lives what the best elements of society will demand that they should publicly teach.

But why, then, are courses in eugenics not now more generally given in our medical schools? What are the obstacles to the inclusion of such a course in the curriculum? Having determined the nature of the obstacles or of the opposition, we need next to consider whether they are reasonable, serious and insurmountable.

In the first place instruction in eugenics, in the form of a number of special lectures on the subject, is already given in some of our medical schools. This indicates at least that the need is felt and the importance of such knowledge to the best physician recognized. Since not all of the better medical schools give such courses, however, we may infer that there are obstacles in the way. What is the nature of these?

One such may be the lack of adequate preparation on the part of students in the fundamentals of biology to properly comprehend the import and application of eugenic facts. There is even now considerable danger that the eugenic propaganda may be injured by its well-meaning but misinformed friends; hence it were better that physicians profess to know nothing about the significance of heredity and eugenics than to disseminate erroneous or vague ideas about these matters. On the other hand, due to their peculiar position of influence and respect, if properly advised about eugenics, physicians could be the most potent factors in spreading, and giving proper direction to, the eugenic propaganda. The above-mentioned

obstacle, however, is speedily being removed; for considerable biological training is already a medical-course prerequisite.

But there may be a lack of properly prepared teachers to present this subject to even properly prepared medical students. Such condition would result almost to the same degree in the same undesirable end of misinformation and misguided emotional activity. This obstacle also is fast disappearing. Once the demand for this kind of help is voiced, there will appear properly trained teachers to instruct physicians, who will be called upon to mediate and apply the eugenic truths. The widespread readjustments that are now taking place in medical instruction generally will adjust also this matter. Just as the fundamental medical sciences of anatomy, physiology and pathology are coming to be taught by specialists—who have submitted to a long preparation for, and are now devoting all their time and energy to, these particular lines of work rather than by doctors who give to these interests only their spare moments—so eugenics will come to be taught by specialists in heredity.

Another obstacle may be raised by short-sighted and self-seeking physicians. But this is perhaps only a relatively very small factor in, and also only a passing phase of, the opposition, and will soon correct itself. Less illness and weakness mean less work and reduced income for a largely prevalent type of physician. For a brief transitional period, then, this type of doctor may suffer. But his interests are negligible beside the greater racial interest. Moreover, he will soon adapt himself to the new conditions. There will always be considerable scope for at least most of the present phases of medicine, in somewhat altered form perhaps, but eugenic science will take its proper place among the fundamental sciences, and greatly help in bringing about the reduction of widespread morbidity by largely eliminating that portion perennially contributed through heredity.

The place of eugenics in the medical curriculum is among the fundamental sciences. The reasons why it is not now holding its proper place will very rapidly disappear. Enlightened society demands the elimination of as much of the physical, mental and moral sickness and weakness as can be prevented. Eugenics gives the key for the practical and humane reduction of the present high rate of racial deficiency. The future physician must be largely an advisory functionary, rather than a dispenser of medicines. And his advice will be solicited not only for the individual and for the present, but for the race and for the future.

The most encouraging prospect for this new scheme of medical activity is the deep interest shown by young medical students in matters of heredity and eugenics. Youth is naturally chivalrous and eager for altruistic endeavours. The practising physician hardened by the cold facts of professional experience frequently loses his earlier idealism, and is very much less susceptible to the eugenic appeal, less tolerant of its aims, and quite unwilling (perhaps unable) to encourage eugenic practice.

Since the future doctors must of necessity be the chief agents in eugenic propaganda, it is very important that they be imbued with its ideals and carefully trained in its principles at the very time when they are most susceptible to influences which appeal to young manhood. It would almost seem that the very future of the race lies in the hands of the coming physicians. Their influence will largely help shape racial conduct and determine the slow or speedy coming of a society living its life according to eugenic principles.

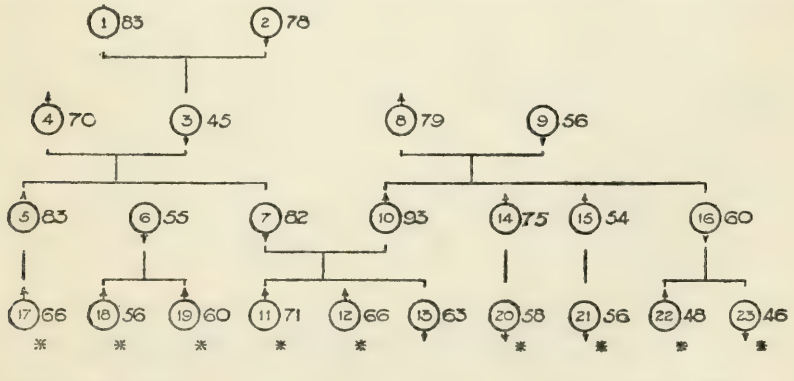
The full attainment of the ideal may be a coincidence of utopia; nevertheless physicians will be more efficient public servants if they approach their work with a eugenic outlook on life; hence for still a third reason the science of eugenics deserves a place in the medical curriculum.

A HEALTHY SANE FAMILY SHEWING LONGEVITY IN CATALONIA.

VALENTINI Y. VIVO,

Professor of Medicine and Toxicology, Barcelona.

The individuals of this Catalan family reached high ages, were born in the district of Barcelona, and all lived there except No. 8, born at Gerona. They have conserved, without any exception, their mental faculties and senses. The diseases, all of acute character, were: No. 1, cholera



nostras; No. 9, Asiatic cholera; No. 3, puerperal fever; No. 4, cerebral apoplexy, very acute; No. 15, bronco-pneumonia; No. 10, acute pneumonia a frigore; No. 8, capillary bronchitis. The others acute thoracic affections.

HEREDITY AND EUGENICS IN RELATION TO INSANITY.

DR. F. W. MOTT, F.R.S.,
Pathologist to the London County Asylums.
Physician to Charing Cross Hospital.

Allow me to thank the Eugenics Society for doing me the honour of asking me to fill the place of so distinguished a physician as Sir Wm. Osler, the Regius Professor of Medicine at Oxford. The subject of Heredity and Eugenics in relation to Insanity is one which I, as Pathologist to the London County Asylums, have been studying in a practical manner for many years, and the more deeply I consider the question the more I find there is to be done before we shall be safe in drawing ultimate conclusions regarding certain practical questions dealing with the prevention of insanity.

The subject of Heredity in its broad aspect is one of national importance and interest, as it affects many social and legislative questions. The interest taken by the general public in the question of heredity is a sign of social progress. People are beginning to recognise the truth of Professor Arthur Thomson's dictum: "The present is the child of the past; our start in life is no haphazard affair, but is vigorously determined by our parentage and ancestry; all kinds of inborn characteristics may be transmitted from generation to generation."

All the modern doctrines of Human Heredity were foreshadowed by the ancient philosopher Lucretius, who, in *dè serum naturæ*, says: "Sometimes, too, the children may spring up like the grandfathers, and often resemble the forms of their grandfather's fathers, because the parents often keep concealed in their bodies many first beginnings mixed in many ways, which, first proceeding from the original stock, one father hands down to the next father, and then proceeding from them Venus produces forms after a manifold chance, and repeats not only the features but the voice and hair of forefathers, and the female sex equally springs from the father's and males go forth equally from the mother's body, since these distinctions no more proceed from the fixed seed of one or other parent, than our face and bodies and limbs. Again we perceive that the mind is begotten along with the body and grows up together with it, and grows old along with it."

Sir Francis Galton, the founder of Eugenics, and to whom the nation owes so much, established the Law of Ancestral Inheritance. According to this law each germ, male or female, contains on an average representative particles or germinal determinants derived from the two ancestral stocks in definite proportions. Thus one quarter comes from each parent, one-sixteenth from each grand-parent, and one-sixty-fourth from each great grand-parent. Thus an inheritance is not merely dual, it is multiple. Galton himself

recognised, however, that this law only applied to masses of people and not to individual cases, for he says: "Though one half of each child may be said to be derived from either parent, yet he may receive a heritage from a distant progenitor that neither of his parents possessed as personal characteristics." Again, speaking of Particulate Inheritance, he remarks; "All living beings are individuals in one aspect, composite in another. We seem to inherit bit by bit this element from one progenitor, that from another, in the process of transmission by inheritance elements derived from the same ancestor are apt to appear in large groups, just as if they had clung together in the pre-embryonic stage, as perhaps they did." They form what is well expressed by the word traits—traits of feature and character, that is to say, continuous features, not isolated points. The offspring of parents possess a mosaic of inheritance bearing usually a more or less similarity, yet the mosaics of character, whether bodily or mental, are not in any way identical, except in the case of identical twins. Now, there is a reason for this. Identical twins are the result of fertilization of one ovum containing two germs of identical substance, and this leads me to refer to Galton's remarkable inquiry into the History of Twins in connection with Nature and Nurture. He found that similar twins living in a different environment nevertheless remained similar in temperament and character, while dissimilar twins brought up and living in the same environment remained dissimilar; these dissimilar twins, however, were the product of two separate ova with dissimilar germs. This shows that every germ has a specific energy of its own, as manifested by a different potential inheritance.

Galton also made a statistical inquiry into good and bad tempers, and as a result of this inquiry he says: "It now becomes clear enough and may be taken for granted that the tempers of progenitors do not readily blend in the offspring, but that some of the children take mainly after one of them, some after another, but with a few threads, as it were, of various ancestral tempers woven in, which occasionally manifest themselves. If no other influences intervened, the tempers in the children of the same family would on this account be almost as varied as those of their ancestors. To recapitulate briefly, one set of influences tends to mix good and bad tempers in a family at haphazard; another tends to assimilate them, or that they shall all be good or all be bad; a third set tends to divide each family into contracted portions. These facts, ascertained by Galton, are of great interest in connexion with the inheritance of the predisposition to nervous and mental diseases, a predisposition which is termed the neuropathic taint. Galton's law of filial regression again seems to explain many facts regarding the inheritance of feeble-mindedness as well as ability. In respect to the latter, Galton showed that only a few out of many children would be likely to differ from mediocrity as their mid parent, and still fewer would differ as widely as the more exceptional of the two parents.

The more bountifully the parent is gifted by nature, the more rare will be his good fortune if he begets a son as richly endowed as himself, and still more so if he begets a son who is endowed yet more largely. But the law is even-handed, it levies an equal succession tax on the succession of badness as of goodness. If it discourages the extravagant hopes of a gifted parent that his children will inherit all his powers, it no less discountenances extravagant fears that they will inherit *all his weaknesses and tendencies to disease*." This tendency to revert to the normal average of the race is thus a great factor in heredity. Amphimixis, or the blending of the inheritances of two individuals, is claimed by Weismann as the great factor in the production of variation and evolution, but when a functional and structural dynamic equilibrium has been established in all the organs and tissues of the body for a species and race, amphimixis would act in an opposite manner in tending to prevent the perpetuation of variation, pathological or otherwise. Change of type comes about through inheritance of modification, and many abnormalities and defects, arising we know not why, are transmitted through successive generations, and apparently are not swamped out by dilution unless they interfere with self-preservation or with marriage selection and propagation. I may cite the following as examples: Polydactylism, six fingers and six toes; brachydactylism, short fingers, lobster claw hand, white tufts of hair, various eye and skin diseases. A remarkable example of an hereditary visual defect is congenital stationary night blindness which has continued through nine generations, affecting 135 members out of close on 2,000 descendants (Nettleship and Cunier). Colour blindness, and the tendency to bleed (hœmophilia) are curious affections limited to the male sex but transmitted by the females. Then we have those tendencies to disease affecting stocks, *e.g.*, tuberculosis, rheumatism, diabetes, gout, and nervous and mental diseases, or neuropathic tendency. In the case of tuberculosis and rheumatism the tendency is shown by a weakness in defence against specific and ubiquitous microganisms. In gout and diabetes there is a tendency in the stock to disease arising from a disturbance of the bio-chemical equilibrium of the blood in relation to the functions of the organs and tissues of the body and nutrition. The neuropathic diathesis may also be due to an inherent tendency to a disturbance of the bio-chemical equilibrium of the blood and the nervous system by which an insufficient storage of potential energy in the nervous system occurs, especially in the brain, or the potential energy stored is unstable, consequently there is an inherent failure to control its conversion into active energy as in epilepsy and other paroxysmal nervous states.

The discovery of Mendelism has opened up a new and vast field of investigation, and although so far Mendelian analysis is as yet imperfectly developed in respect to human inheritance, yet as Bateson says: "Organisms may be regarded as composed to a great extent of separate factors, by virtue of which they possess their various characters or attributes. These factors are detachable, and may be recombined in various ways. It thus becomes

possible to institute a factorial analysis of an individual." How far such analysis can be carried we do not yet know, but we have the certainty that it extends far, and ample indications in supposing that we should probably he right in supposing that it covers most of the features, whether of mind or body, which distinguish the various members of a mixed population like that of which we form a part. From such a representation we pass to the obvious conclusion that an individual parent is unable to pass on to offspring a factor which he or she does not possess. Since those individuals only which are possessed of the factors can pass them on to their offspring, so the offspring of those that are destitute of those elements do not acquire them in subsequent generations, but continue to perpetuate the type which exists by reason of the deficiency. It should be explicitly stated, however, that in the case of the ordinary attributes of normal men we have as yet unimpeachable evidence of the manifestation of this system of descent for one set of characters only, namely, the colour of the eyes. Moreover, if the evidence as to normal characteristics of man is defective—which in view of the extreme difficulty of applying accurate research to normal humanity is scarcely surprising—there is in respect of numerous human abnormalities abundant evidence that a factorial system of descent is followed." (Bateson: Biological Fact and the Structure of Society.)

This may be, as Bateson claims, true for certain well defined abnormalities, *e.g.*, polydactylism, brachydactylism, xeroderma pigmentosa, or for night blindness, but as applied to the inheritance of a diathesis or tendency, *e.g.*, the neuropathic, Mendelian proportions are not shown as a rule, although there is evidence of segregation of the factor underlying the diathesis or tendency.

With this brief introduction to my subject, allow me to consider the problem of Heredity and Eugenics in relation to insanity. Let me first define my terms: Heredity has been defined by Thomson as "the genetic relation between successive generations, and inheritance includes all that the organism is or has to start with in virtue of its hereditary relation." Heredity is a relation in successive generations which is sustained by a more or less visible material basis, the germinal substance. Eugenics is the science of racial improvement by the application of the laws of heredity, viz., by encouraging the survival and the propagation of the fittest in all classes of society, and by seeking to cut off the lines of inheritance of the unfit in all classes of society. However, we do not know enough about human genetics to predict always the fittest and the unfittest. Some of the greatest men the world has seen have sprung from the most humble and unknown stocks. Eugenics, therefore, should aim at giving every individual that is worth preserving in every class a chance of survival. A living wage, enough to ensure a sanitary dwelling and a sufficiency of nourishing food for parents and family, should

be possible for every labourer and artisan. For if the rich and the intellectuals will in a progressive manner restrict their birth-rate, natural selection is deprived of its rights among these classes, and Eugenists can have no sympathy with such but rather with the masses of the people. The wealth of the nation depends upon labour, and labour demands a sufficiency to live and propagate under far more favourable conditions than now exist in our great cities, where the poorer the people and the more uncertain their wages the higher is the rent demanded for the miserable tenements in which they have to bring up a family. It is a fact, as Professor Karl Pearson keeps urging, that at the present time in Great Britain restriction of families is occurring in one-half or two-thirds of the people, including nearly all the best, while children are being freely born to the feeble-minded, the criminal, the pauper, the thriftless casual labourer, and other denizens of the one-roomed tenements of our great cities. The alien Jew and Irish Roman Catholic have large families as their religion prohibits restriction, perhaps unfairly in the case of the Irish, for the poorest classes of the population in some of our large cities are largely of Irish extraction. Professor Pearson keeps warning us that 25% of our population, made up mainly of the above-mentioned poor types, is producing 50% of our children, and if this goes on must lead to degeneracy. If the better classes will not propagate they must pay for the propagation of the poorer classes, and natural selection, aided by human effort, must encourage the propagation of the fit and the cutting off the lines of inheritance of the unfit.

In considering the subject of Heredity and Eugenics in relation to insanity, we have to ask ourselves what constitutes insanity at the present time. It is often extremely difficult to draw the line between sanity and insanity. It may, however, be asserted that a person is insane who, on account of disease or disordered function of the brain, can no longer feel, think or act in accordance with the customs and social usages of the community in which he lives. An individual is judged to be sane or insane by his conduct, but behaviour by itself without consideration of the social environment is an insufficient criterion. Every case of insanity is a biological problem, the solution of which depends upon a knowledge of what a man was born with "nature" and what has happened after birth "nurture." No child is born insane, though it may be born feeble-minded, either from actual organic disease or an inborn germinal cerebral deficiency. The former, being an acquired character, is not transmissible; it is better to speak of such mental defects as congenital. Congenital defect is not heritable, a fact of very considerable importance in diagnosis, especially as regards segregation with the view of prevention of transmission of feeble-mindedness.

Registered Insanity in London.

The registered pauper insanity in London is 5·5 per 1,000 of the total population, whereas for England and Wales it is 3·4 per 1,000; naturally

there is a widespread belief that insanity is greatly on the increase.

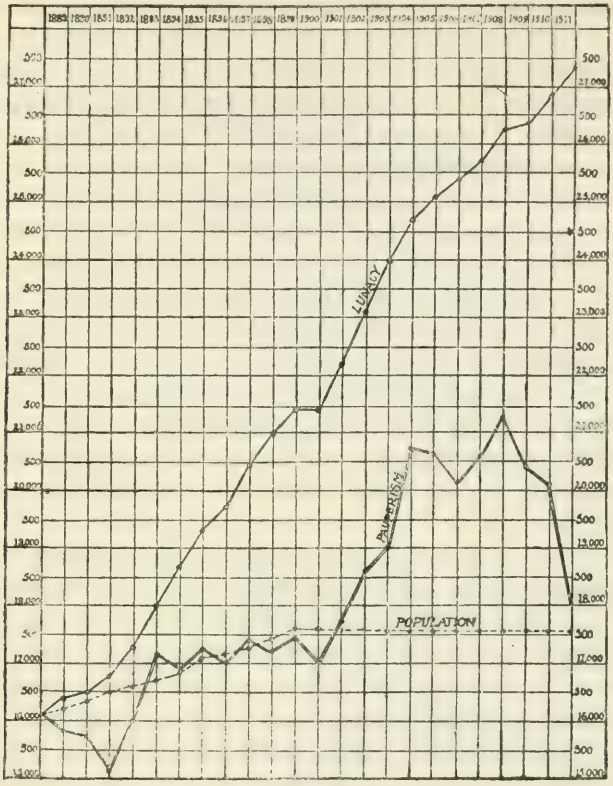


Fig. 1

If we look at the accompanying Fig. 1 it will be observed that while the population of the county of London has been nearly stationary, registered insanity has practically doubled. It will be observed that pauperism also showed a marked rise for 10 years, while it has fallen for the last three years, but although there has been this fall in pauperism during the last three years there has been a steady rise in registered insanity. It might be thought, therefore, there was no correlation between pauperism and insanity. This is not so. No doubt the fall in the curve of pauperism has been due to old-age pensions. Now, old-age pensions will not affect registerable insanity in London the same as it will in rural and urban districts where the housing conditions are more favourable for the retention at home of old-age pensioners suffering from senile decay. Twenty per cent. of the admissions to the London asylums are old people, most of them suffering with senile decay. The great increase of insanity, in my opinion, is *apparent rather than real*, and for the following three reasons :—

Firstly, the standard of sanity has been raised; a great number of harmless idiots and feeble-minded persons who were formerly allowed to

roam at large are now gathered into the London asylums through the agency of the Special Schools. The increase of accommodation for the insane has been doubled in the county of London during the last 12 years. There is not the slightest reason for supposing that insanity has doubled in a stationary population; no doubt numbers were formerly discharged as recovered on account of pressure of new cases. Correlated with the provision of adequate accommodation by the authorities, the necessity of discharging patients to make room for urgent admissions has steadily diminished in recent years; and probably this explains the fact that the number of patients discharged as recovered shows a constant and continuous diminution of numbers. According to the report of the Clerk of the Asylums Committee, out of the large mass of registered lunacy in London only 2·9 per cent. according to the medical superintendents have a favourable prospect of recovery, 5·42 per cent. are doubtful, and 92·19 per cent. are unfavourable. By thus providing such increased accommodation for the permanent segregation of incurable insanity the London County Council have been practical Eugenists, for as I shall show you, heredity is the most potent cause of insanity.

Another and very important cause of increase of asylum accommodation is a diminishing death rate in asylums from tuberculosis, dysentry, pneumonia, and other microbial infectious diseases. There is, therefore, a constant tendency to silt up the asylums with chronic incurable cases. That this is so, is shown by the fact, that at the present time nearly one-half of the inmates of the London County Asylums have been resident in asylums more than ten years. Again, at the end of 1910 no less than 4,238 patients, known to have been insane more than twenty years, were in the London asylums; moreover, such long standing cases have been accumulating during the last four years at rates varying from 125-200 per annum.

The third cause of the increase of registered insanity rests with those who certify paupers. The degree of mental unsoundness necessitating asylum treatment depends largely upon the provision obtainable for nursing and taking care of incipient cases of insanity and aged persons who are suffering from senile decay. In the report of the Asylums Committee, 1910, p. 110, it is stated that as many as 4,762, or 23 per cent. of the inmates of the London County Asylums were suffering from dementia, senile and secondary; this indicates that a number of these aged persons who were formerly treated in the infirmaries are now sent to the asylums where they can be better cared for. An inducement to send these cases by the Guardians is the fact that the Government pays the Guardians 4s. per week for each pauper lunatic. It is hardly fair, however, to cast the stigma of insanity on a stock in the case of simple senile decay.

The Correlation of Pauperism, Insanity, and Feeble-Mindedness.

The registered insane in London is 5 per 1,000, whereas in England and

Wales it is only 3·5 per 1,000 (Fig. 2). On the face of it, this would

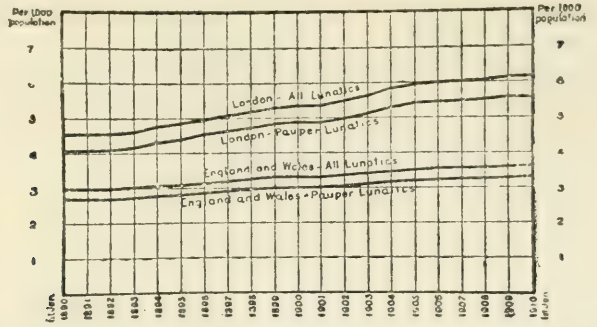


Fig. 2.

appear to show that conditions existed in London which led to insanity that were not so intense, or did not exist in the rest of the country. But more probable is it, that London during the last 15 years by doubling its asylum accommodation has gone far ahead of the rest of the country in this practical method of applied eugenics.

Nevertheless, when we compare the registered pauper lunatics in different boroughs as this table which I exhibit shows, we shall be struck not only with the variable percentage for the different boroughs of the County of London, but also by the fact that in boroughs with a poor population there is a much higher percentage. You will observe the relative low percentage of Hampstead 2·6 per 1,000, Lewisham 2·8, Wandsworth 3·5; whereas it is 7·9 per 1,000 in St. Pancras, Westminster 8·1, St. Giles-in-the-Fields and Bloomsbury 9·2, Strand 12·7. The explanation of the high percentage of these latter, excepting the Strand, is that the pauper population is largely composed of the denizens of one-roomed tenements with a low wage earning capacity, and in districts where we should, owing to improvements and the pulling down of slum property, expect a diminution of pauperism and insanity, there is no decrease, and in many instances an increase. Owing to better and cheaper means of locomotion an increasing number of the better classes and more desirable members of the lower classes, *e.g.*, artisans and those in continuous employment, have migrated to the suburbs, the result being that in many boroughs large houses, which were formerly occupied by one family of the better classes, are now converted into flats and tenements accommodating a number of families generally very poor and relying upon casual labour. Woolwich has a relatively low percentage, 4·6 per 1,000, and I should attribute this to the fact that the majority of the householders, although not possessing high wage earning capacity, are more or less skillled artisans in comparatively continuous employment, whereas at Stepney (6·6), Poplar (6·2), and St. George's (6·4) casual labour and lower wage-earning capacity predominate, with a proportionately higher rate of overcrowding in one-roomed tenements and pauperism. It is probable that those parishes which had a high rate of registered pauper lunacy would

also have a high rate of births, of infant mortality, and of tuberculosis. While yielding to no one in the desire to see temperate measures adopted for the control and regulation of the liquor traffic and the segregation of the chronic inebriate, who, in my judgment, is more dangerous to society than the lunatic; nevertheless, I am of opinion that there is no proof that certifiable insanity would diminish to anything like the extent that is fondly cherished by total abstainers if alcohol were abolished. I feel certain, however, there would be less disease and far less crime and pauperism than now exists in the general population of this country. Dr. Bevan Lewis and Dr. Sullivan, by careful analysis and tables, have shown that in the regional distribution of insanity it is difficult to trace any evidence of alcoholic influence such as might be expected if alcoholism really accounted for a sixth of the total cases of registered insanity. They have shown that inland and *agricultural* communities were the least inebriate, but had the highest ratios of pauperism and insanity; inland and maritime *mining* and *manufacturing* communities above all others were the most intemperate, yet revealed the lowest ratios of pauperism and insanity. Dr. Sullivan concludes that alcohol, as the essential cause of certified insanity, falls a good deal short of the 16 per cent. at which it is rated in the official statistics. This entirely conforms with my observations on post-mortem examinations in hospital and asylum practice. There is a correlation, however, between the wage-earning capacity of a population, pauperism, insanity, and tuberculosis. As the mentally and physically more fit migrate from the agricultural districts to the industrial centres, or emigrate, a progressively, mentally, and physically enfeebled rural population must result. Like tends to beget like, and so Eugenists should urge back to the land as one of the most pressing calls for legislation if we do not want a complete mental and physical deterioration of our rural population. It is a well-known fact that the feeble-minded are especially prone to tuberculosis, which is one of Nature's methods of eliminating the unfit. Imbeciles and idiots are often sterile, which is one mode by which a completely degenerate stock may die out, but degenerate stocks generally contain feeble-minded of all grades, the majority of which will not die out, but propagate freely, and no class of the community is responsible for registered insanity, and (at present) unregistered feeble-mindedness to such an extent as the mentally feeble. The progeny begotten of a feeble-minded mother by a drunken father, according to my experience, is much more likely to be born mentally defective or become insane in later life than when both parents are intemperate, but neither of inherent mental deficiency. I have many pedigrees which seem to indicate that a perfectly sound stock may degenerate from a combination of pathogenic factors, viz., stress of town life, alcoholism, syphilis, and tuberculosis occurring in the progenitors in successive generations. Wage-earning capacity of the masses depends upon two factors, energy and sagacity, and the feeble-minded are

usually deficient in both, but their deficiency in energy, physical and mental, is largely due to an inborn deficiency, but not always, or altogether, for owing to their low wage-earning capacity, the environmental conditions are correspondingly poor, especially is this the case with the denizens of the one-roomed tenements of our great cities. Bad sanitation, insufficient food, air and sunlight, alcoholism, syphilis, tuberculosis, and infectious diseases all conspire together to sap the vital energy of the unemployed, the casual labourer, the women, especially mothers, and the children. By no means all these people are of the eugenically unfit; many by improvement of their environment may have that restoration of vital energy which is essential for will power and the exercise of an inborn sagacity which chance, opportunity, or ill fortune has denied them. In proof of this you have only to visit such schools as Shenfield, or even Barnardo's Homes, to see that environment plays a very important part in the development of energy, sagacity, and character. You cannot make good material out of bad raw material, but fairly good material or even good material may be spoiled by a bad environment. Even an inborn virtue may, by evil surroundings, become the source of the worst vices.

The Effects of Poisons, e.g., Alcohol, Syphilis, and Tuberculosis, upon the Germ-plasm.

An important racial question is this: Do poisons, such as syphilis, alcohol, and tuberculosis, diminish the vital energy of the male and female germ prior to conjugation and cause pathological variations?

It is a known fact that toxins weaken cells, and therefore why not germ-cells? For although the sexual cells are segregated in the body, they are of the body and nourished by the same blood and lympth, and there is consequently reason for supposing that these most potent and prevalent poisons, alcohol, syphilis, and tuberculosis, may, without killing the germ-cells diminish their specific vital energy and thus lead to various pathological conditions of the body, and especially of the nervous system. There can be no doubt that syphilis of the parents may lead to infantilism in the offspring evidenced by arrest of development of the secondary sexual characters. If syphilis can produce arrest of development of the reproductive organs, there is no reason why it should not lead to arrest of development of the brain, and if syphilis of the parent can produce an arrest of development of the sexual organs in the offspring so that there is sterility, there is no reason why the specific energy of the germ-cells should not be affected without actually destroying them. It is an established fact that if congenital syphilis were not so fatal to infant life, the number of people suffering from paralysis of various kinds and insanity from this cause would be appalling. A blood test tends to show that syphilis is the cause of a larger number of idiots and imbeciles than was formerly believed. Acquired syphilis, and in rare cases congenital syphilis, are now acknowledged to be

the cause of the most terrible form of insanity: general paralysis. This disease is fatal a few years after the onset of symptoms; heredity plays relatively an unimportant part in its causation; it affects all classes in proportion to their liability to syphilitic infection. There are no reliable statistics to show whether syphilitic infection is more prevalent at the present time than formerly; severe obvious affections are not nearly so prevalent owing probably to a racial immunity or partial immunity, but there is no assurance that the late manifestations affecting especially the brain and spinal cord are not more numerous than formerly. It is certain that with the conversion of the rural into an urban population, the more ready mingling of the town and country population, the short military service, and the frequency with which soldiers were syphilized by service in India, and other causes incidental to life in large cities with their armies of professional prostitutes and clandestine prostitutes, the possibilities of a general and widespread syphilization of the race has occurred since the development of the railway system in England. This has probably led to a partial racial immunity, and the widespread existence of the disease in a latent form. The Eugenics Education Society, recognising the great importance of this vital public health question, has endeavoured to obtain an enquiry regarding the prevalence of this disease and the effects of treatment. As the Insurance Act has wisely not deprived sufferers from this disease of medical benefits, an opportunity will shortly arise of ascertaining the prevalence of the disease, at any rate, in active form, among 15 million of the population. New methods of treatment make one have the greatest hope of combating this scourge of the unborn millions who are either killed off before birth, shortly after birth, or who later suffer from terrible diseases of the nervous system, viz., blindness, deafness, idiocy, imbecility, and paralysis. It is a notifiable disease in Scandinavian countries, and I am informed it has recently been made notifiable in Australia. Our first duty, in the hope of prevention, is the scientific study of the cause. This has not been barren, for one of the greatest advances preventive medicine has made was the discovery of the organism of syphilis by the biologist Schaudinn; this has led to experiments of the greatest value, and an outcome was a bio-chemical test whereby the syphilitic virus can be detected in the body, even when there are no obvious symptoms. This test enables us to detect not only the active virus, but those late manifestations of syphilis, locomotor ataxy, and general paralysis of the insane. Moreover, it confirms the view I have always maintained of the syphilitic origin of these two diseases.

A sufficient time has not yet elapsed to show whether the widespread use of the new drug, "606," introduced by Ehrlich after a long series of carefully contrived experiments, may not diminish the number of cases of this terribly fatal disease (general paralysis of the insane) and of locomotor

ataxy, which is the same pathological change, affecting a different part of the nervous system.

If there were time I could give logical arguments in favour of this hypothesis, but I must be content with saying that since we now know the cause of 20 per cent. of the deaths in the London County Asylums is due to general paralysis, therefore one very important preventable cause has been discovered. Not only is it important as regards numbers afflicted by this terrible malady, but it is important because the sufferers from this disease are drawn from all grades of society, and as a rule are of civic worth; the same cannot be said of the feeble-minded.

We might add another 5 to 10 per cent. of cases of brain disease dying in asylums with softening of the brain due directly or indirectly to syphilis. In congenital syphilis it is appalling to think what a number of feeble-minded adults there would be from this cause did it not happen that when the syphilitic organism invades the brain it is fatal in the great majority of cases. The congenital syphilitic offspring of diseased parents as a rule die before birth or in early infancy. Still, the bio-chemical test that I have referred to shows that a considerable percentage of the feeble-minded may owe their defect to this preventable cause.

Neuropathic Inheritance.

Three years ago I initiated a card system of relatives who are at present, or have been discharged from, or have died in, the London County Asylums. The ball once set rolling has grown to enormous dimensions, and I have at present considerably over 3,000 cards, most of them referring to persons closely related in the direct line. There are at the present time about 750 closely-related persons inmates of the London County Asylums; namely, 3·5 per cent. of the total population. *A priori* this is a strong argument in favour of the importance of heredity as a cause of insanity, for it cannot be supposed that if we took 20,000 people from the 4,522,961 inhabitants of London for some random cause we should fined 3·5 per cent. of them so closely related, as parents and offspring, brothers and sisters.

Table I.

Statistics of 3,042 Related Cases in the London County Asylums.

	Discharged.	Transferred.	Died.	Resident.	Total.
Males	256 19·2%	60 4·5%	392 29·4%	626 46·9%	1,334
Females	353 20·6%	59 3·4%	389 22·8%	907 53·1%	1,708
Total males and females	609 20·0%	119 3·9%	781 25·6%	1,533 5·04%	3,042

The above table shows the proportion of males to females; the latter are much more numerous; it will be observed that owing to a lower death-rate of the females, they tend to accumulate. This is no doubt due to the fact that general paralytic males are three times as numerous as females, whereas other non-fatal forms of insanity are much commoner in females. It will be observed that of the 3,042 relatives who are at present or have been in the London Asylums 1,533 still remain resident, a little more than half. I shall have occasion later to refer at length to some important deductions made from the age incidence of the first attack of insanity in these insane relatives.

Nature and Nurture.

No child is born insane, though it may be born feeble-minded either from actual organic disease or inborn germinal cerebral deficiency. The former being an acquired character is not heritable, a fact of very considerable importance in diagnosis and segregation with the view of prevention of transmission of feeble-mindedness.

We should endeavour to study every case of nervous or mental disease as a biological problem, ascertaining as far as possible what the individual was born with, ancestral inheritance (Nature); what happened during development after conception (congenital); finally what happened at or after birth (nurture). The collection of statistics and pedigrees merely relating to the question of certifiable insanity or epileptic fits is quite inadequate for scientific purposes, as the *neuropathic predisposition* manifests itself in many ways; and it is necessary to seek the first stages and less obvious conditions of degeneration in a stock. Morel, who studied this question more than fifty years ago, pointed out that nervous irritable weakness, the neurotic temperament, neurasthenic predisposition, may be the first evidence of degeneration of a stock. The inborn morbid neurotic temperament may be manifested in a variety of ways by the behaviour and conduct observed in various members of the stock. The signs of degeneracy which may be exhibited are self centred narrow-mindedness in religious beliefs, fanaticism, mysticism, spiritism, an unwholesome contempt for traditional custom, social usages, and morality, a vain spirit of spurious art and culture, a false self-loving vanity in the pursuit of a sentimental altruism, or by eccentricities of all kinds; such signs of degeneracy are often combined with talent and even genius, especially of the constructive imaginative order; but the brilliant intellectual qualities of a degenerate are invariably associated with either a lack of moral sense or of sound judgment and highest control. Time, chance, circumstances, and opportunities play an especially important part in moulding and determining the career of a neurotic stock; circumstances and environment may favour one member and he rises on the tide of fortune to an eminent position, whereas another, unfortunate or less fortunate, but with

a similar inborn temperament, dies in an asylum or commits suicide in despair.

I have often found in the collecting of pedigrees the association of insanity and suicide in a stock preceded by, or associated with, the existence of individuals possessing the melancholic, suspicious, brooding, self-centred, hypochondriacal temperament; and it is not uncommon for suicide of one or more members of the stock in successive generations to occur. Associated with these temperamental evidences of degeneracy of a stock may be chronic alcoholism, dipsomania, hysteria, hypochondriasis, exophthalmic goître, neurasthenia, psychasthenia, migraine, *petit mal*, or neuroses of an epileptic character, often unrecognised because not manifesting fits of the major form of the disease. In searching for the neuropathic tendency there are, therefore, many possibilities of missing the inborn factor of a neurosis or psychosis though a careful inquiry be made, even when aided by intelligent co-operation on the part of the friends.

Some Illustrative Pedigrees Showing Various Manifestations and Results of the Neuropathic Taint.

Fig. 3.—A. B., an alien Jew, aged 54, was admitted to an asylum for the first time suffering with involutional melancholia; he has a sister who has not been in an asylum, but, as events turned out, bore the latent seeds of insanity. The man is married to a healthy women who bore him a large family; the first five are quite healthy, then comes a congenital imbecile

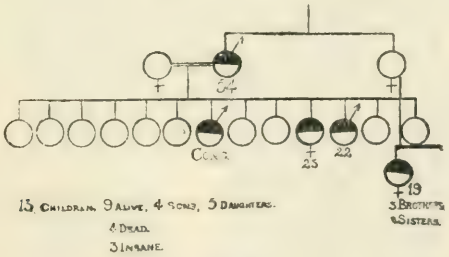


Fig. 3

epileptic (cong.), then two healthy children followed by a daughter who becomes insane at 23, then a son insane at 22, and lastly two children who are up to the present free from any taint. The sister of A. B. is married and has a family of ten, seven girls and three boys; one of the females was admitted to the asylum at the age of 19, and since this pedigree was constructed a brother of hers has been admitted, aged 24. Half-black circles are insane.

The pedigree is instructive; it shows direct and collateral heredity; it also shows remarkably well the signal tendency to the occurrence of insanity at an early age in the children of an insane and potentially insane parent.

Fig. 4.—A very comprehensive and interesting pedigree obtained for me by Dr. Wilson White, showing the result of marriage of a nearly sound

stock in which the temperament was, generally speaking, of the sanguine type; there was only one member insane at 55; she was unmarried; her four sisters, who were all married, had some healthy, grown-up children. The brother himself, perfectly sane and healthy, married a woman descended from stocks in one of which there were many members suffering with epilepsy (E.); indeed, her father and her grandfather suffered with it. On the maternal side there was suicide (S.) of an aunt and insanity of a grandfather; most of the members of this stock were of a melancholy, brooding temperament. The result of the mating of these two neuropathic stocks is shown. There were nine children, of which three, marked with deep, black-rimmed circles, suffered with some form of neurosis, a male

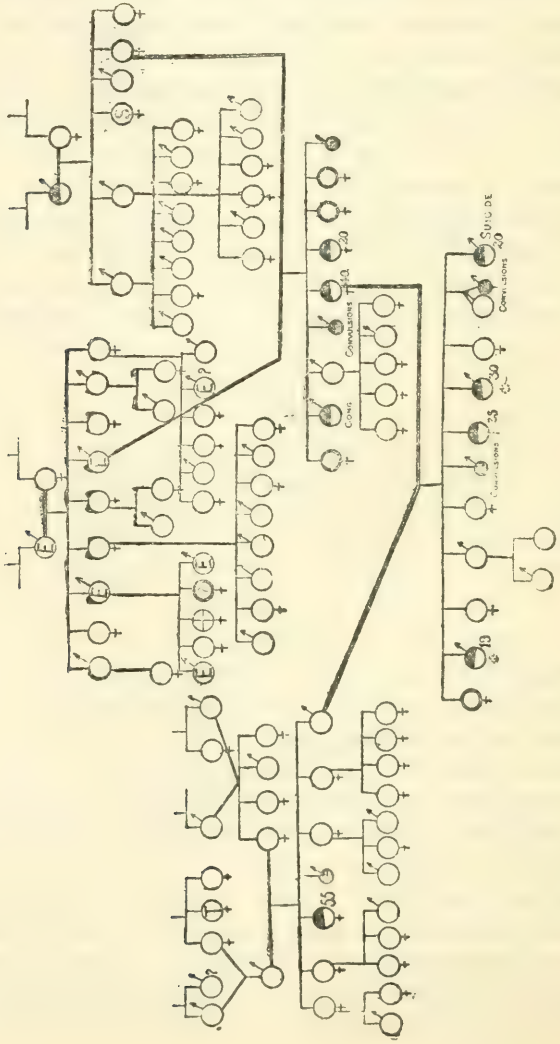


Fig. 4

congenital imbecile, a healthy male who has five healthy children, a child who died in early life of convulsions, the patient's mother who became insane at the age of 40, a female who became insane at the age of 20, two females also suffered with some form of neurosis, lastly, a male who died in early infancy.

The next generation shows the result of mating this unsound stock with an almost healthy, sound stock. There are not as many unsound members as in the last generation, and we observe that the four members that became insane at 19, 25, 30, and 20, all had their first attack at a much earlier age than their mother, one of these committed suicide and two were found dead; this pedigree illustrates well the signal tendency to the occurrence of antedating. The sound members of the stock apparently inherited their temperament from the father's side, and the one member that is married has quite healthy children; this looks as if the unsound elements of this degenerate stock had been cleared out by segregation of the unsound germinal determinants, causing intensification of the disease and occurrence of the onset at an early age, thus preventing propagation.

Fig. 5.—This pedigree shows the result of marriage of first cousins, in both of whom there was a latent neuropathic taint. The family consisted of three individuals, two sisters, A. and B., and an elder brother who was married but had no family.

B. married a first cousin, and although neither of them was insane nor epileptic, yet they had two children epileptic and one a congenital imbecile; this terminated the stock on that side. That there was latent insanity was shown by the result of the marriage and the fact that a sister became insane. A., however, married into a healthy, virile stock; she became insane at 38, although living many years after she never recovered,

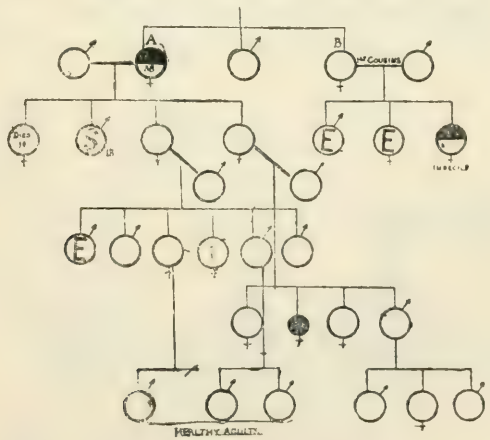


Fig. 5

the exciting cause was the death of a son by suicide (S.) at 18. There were two daughters who became mothers of families, the eldest son of one

suffered with a marked epilepsy, but no other evidence of neuropathy was shown in this generation. The taint seems to have disappeared, inasmuch as there are healthy, grown-up members of the fourth generation.

Fig. 6.—A pedigree illustrating marriage of first cousins. A genius was the product who married a healthy woman, and the family consisted of an eldest son, committed suicide (S); a second son, epileptic (E); a daughter, healthy, unmarried; and a fourth son a genius. This man was a genius,

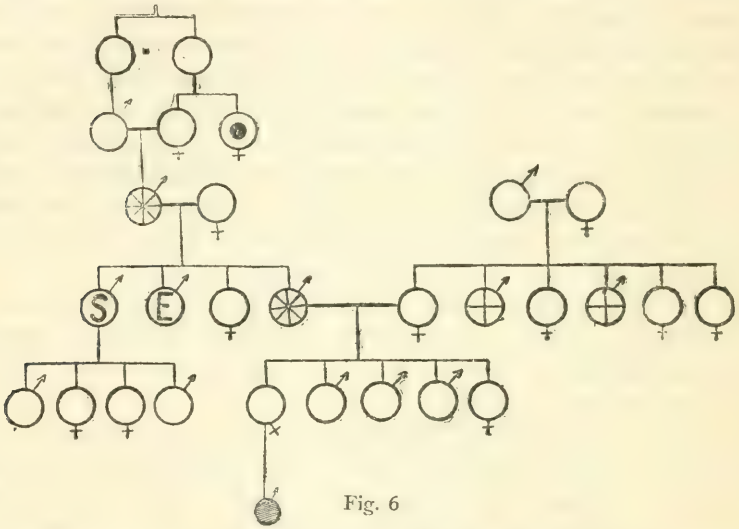


Fig. 6

but had an extremely well-balanced mind; all his five children are healthy in spite of collateral insanity.

Fig. 7.—A family of drunken and insane people. The figures with half black circles are insane; the same with the cross indicates drink and

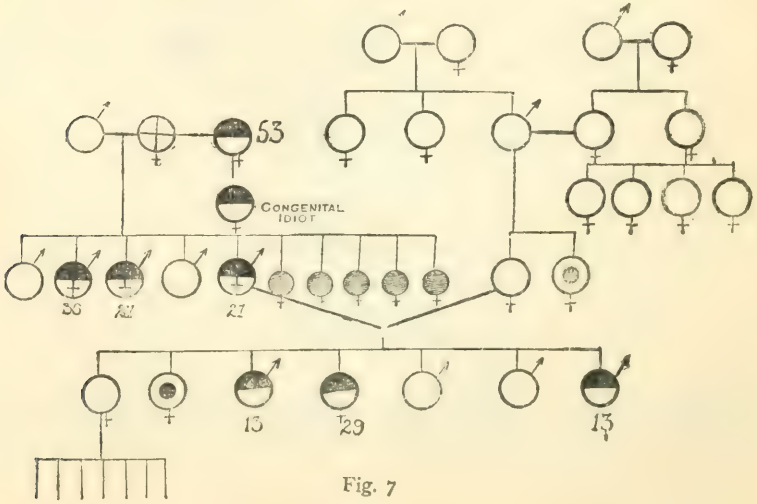


Fig. 7

insanity; the circles with only a cross indicate excessive drinking. The two stocks show a marked difference; one side the maternal is practically free from any taint; almost every member of the paternal stock is unsound.

The degeneracy commenced with a drunken woman whose sister died, age 53, in Colney Hatch Asylum, where she had been 20 years; she had a congenital imbecile daughter in Leavesden.

The result of mating a sound individual with a drunken woman with insane predisposition is shown in the members of the family born: a son healthy, then two sons who were insane at the ages of 36 and 27, then a healthy son, then another son who also was insane at 27, finally five children who died in early life, probably through the neglect of a drunken mother, indicated by small, shaded, circular figures. One member of this drunken and insane family married into a healthy, sound stock. Seven children were the fruit of this marriage; of these, two sons and a daughter were normal and three were insane, two of them having become insane at the age of 13. The clear circle with a black centre indicates bodily disease.

I used to give this pedigee as an instance of drink causing insanity, but after the establishment of the card system of relatives I found the notes of the sister of the drunken grandmother; she was an inmate of Colney Hatch for 20 years. It sometimes happens that the one is taken and the other left, and it would have been a benefit to society if the drunken progenitor of this degenerate stock had been taken.

Fig. 8.—The ending of a degenerate stock is illustrated in this pedigree. A very distinguished man had a dissolute daughter, drunken and immoral

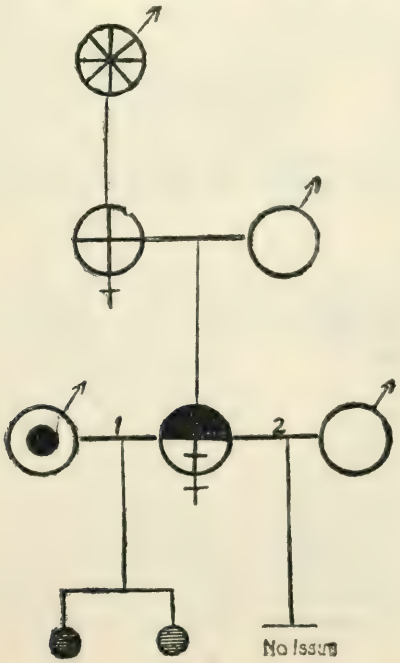


Fig. 8

(figure with a cross); she had a daughter who behaved in a similar manner, was married twice, then became insane; by her first husband she had two children born dead.

Fig. 9.—A pedigree showing pauperism, fecundity, insanity, and infant mortality. Shaded circles indicate infants dying in early life.

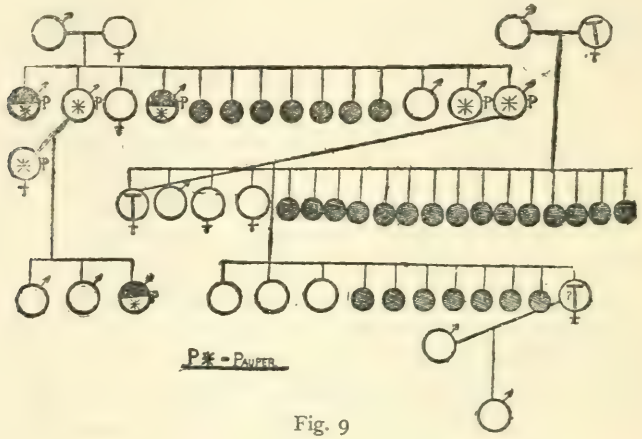


Fig. 9

Fig. 10.—A pedigree showing pauperism, insanity (black half circles), and blindness in four generations (Lidbetter.)

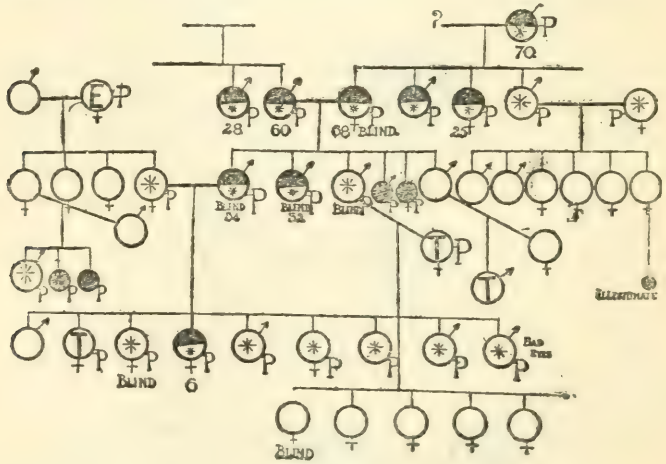


Fig. 10

Figs. 11, 12, and 13.—Three pedigrees to illustrate "antedating"; the onset of insanity in the offspring is shown to occur at a much earlier age than in the parents. These pedigrees also illustrate extreme cases of hereditary transmission of the neuropathic taint; as a rule not more than one insane

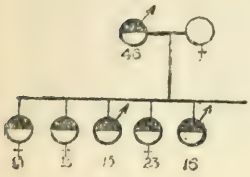


Fig. 11

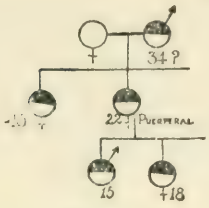


Fig. 12

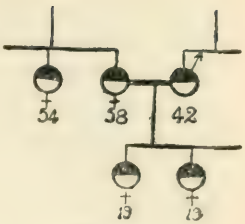


Fig. 13

offspring of an insane parent occurs in four or five. The occurrence of insanity in all the children is probably due to the fact that there is a double insane inheritance in all these instances, although it is only shown in one completely, and one partially.

Fig. 14. Two total abstainers, but born of drunken parents (circles with cross)and with direct and collaterial insanity in stocks (black figures), give birth to eight children, the first two are healthy and grown up, the second with numerous children; then come two children (shaded circles) dying in early life, followed by a son and two daughters (black figures) all suffering from dementia of adolescence, and lastly a healthy daughter with children. What we want to know is this: have all the unsound elements been segregated out? This can only be ascertained by following up the children of the sound or apparently sound members.

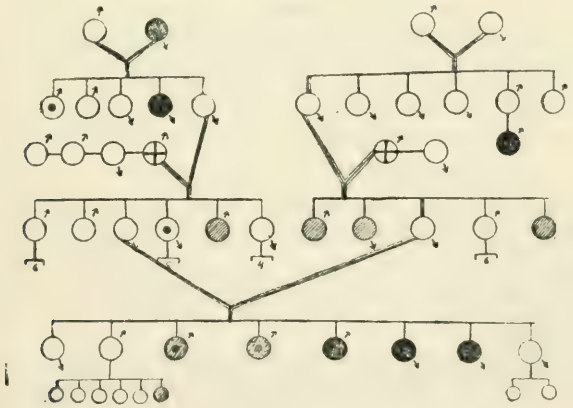


Fig. 14

The Importance of Ancestral Inheritance.

Everybody knows the value of coming from a good stock or a bad stock, and in judging whether an individual who is insane should marry and propagate or not it is absolutely necessary as the study of a large number of pedigrees shows that we should consider (1) the nature of the insanity, and (2) what was the cause. Certain forms of insanity are much more likely to be transmitted than others either in the same form or still more fre-

quently in some other form indicative of the neuropathic taint. The card system of relatives which I shall refer to in detail, investigated for me by Dr. Edgar Schuster showed that epilepsy, recurrent insanity, and delusional insanity are especially liable to be transmitted in the same form, but general paralysis, which is now recognised as an organic brain disease due to syphilis, is not due to heredity, and the cases consequently do not figure largely in these relative cases.

In considering the question of marriage and propagation a study of these relatives and pedigrees convinces me of the importance of looking back into the stocks and ascertaining whether there are many lines of defective heredity, and whether with some lines of defective heredity there are lines of sterling worth, for often enough with insanity and epilepsy we find great talent, even genius and members of civic worth. The very fact that a person would come and consult the physician as to whether he should marry or not is a sign of civic worth and high moral character, and in giving advice we should be guided by a consideration of the stock into which he or she proposes to marry. If there is a neuropathic tendency in that stock, marriage into it should be discountenanced, for I shall show you that the chances of insane offspring arising are much greater. Let me illustrate my remarks by two pedigrees, one is that of a man of genius and remarkable mental stability with a bad collateral heredity (Fig. 6), the other is that in which pauperism, tuberculosis, and blindness in successive generations occur. (Fig. 10.) It would have been a national calamity had the former not been allowed to propagate; to cut off the lines of propagation in the latter would have been a national benefit. The popular expression, "He comes from a good stock or a bad stock," then, is the result of experience and quite scientific according to the laws of ancestral inheritance, yet now and then even from an apparently unknown or even bad stock a great man arises. Are we to say that because a parent is insane that therefore the children must necessarily be insane or useless to the race? God forbid! The parents of some of the most eminent men became insane and genius with insanity frequently occurs in the same stock indicative of a variation from the normal average.

The great point in any scientific investigation is not to try and prove something, and to avoid any propagandist tendency: thus the question of alcohol and insanity is an illustration in point. The Council of Fifty in Massachusetts investigated the number of patients admitted to asylums in which there was an alcoholic history: it was then suggested that they might investigate the number of total abstainers, it was found that they were as numerous. The scientific way to approach this question is to carefuly investigate the pedigrees of patients admitted, selected not because they show a large number of members of the ancestral stocks as being degenerate or insane, but selected because a complete family history can be obtained for three generations.

This has been most successfully done by Dr. Hill Wilson White,

formerly at the Manor Asylum. The pedigrees he has obtained show conclusively that we must judge the right of a patient to propagate who has had an attack of insanity by a full consideration of his pedigree. Certain pedigrees which I have are of interest in relation to the question of alcohol; they are numerically insufficient to draw any conclusions, all we can say is they are indicative of a devitalisation of the germ when chronic poisoning occurs in successive generations. (Figs. 7, 14.)

Statistics Relating to 3,118 *Relatives*

They show the following facts:—

1. In the insane offspring of insane parents, daughters are much more numerous than sons.

2. Amongst insane members of the same family (brothers and sisters) sisters are more numerous than brothers.

This may be correlated with the fact that more women are in asylums than men. There are several reasons for this: general paralysis, which is a fatal disease, is three times more frequent in men than in women; the recoveries in women do not bear the same proportion as in men. Now, why should women be more liable to become insane than men? I will briefly summarize the causes which, in my opinion, are operative:—

1. The physiological emergencies connected with reproduction, *i.e.*, the menstrual periods, child-bearing, and the cessation of the period of reproduction, the climacterium.

I would also add as an important and perhaps the only cause in many instances the enforced suppression by modern social conditions of the reproductive functions and the maternal instincts in women of an emotional temperament and mental instability.

Anticipation or Antedating.

Dr. Maudsley has observed that Nature tends to mend or end a degenerate stock. Now, how could Nature best end or mend a degenerate stock? Obviously by segregating in a relatively few germs all the unsound elements, leaving the others as it were free. The accompanying figure 15 helps to explain this theory.

Assuming the intensity of inheritance is constant for each chromosome or other unit of germ-plasm, but to vary with the number of the germinal units tainted, we have as a result of the mating of these two tainted stocks all degrees of manifestation of ancestral characters from perfect normality to the most profound disease. The more numerous the tainted germinal units the greater will be the chance of the disease appearing in the offspring. On the other hand, the oftener reduction, with its possible random arrangement, has occurred—*i.e.*, the greater the number of generations—the less will be the chance of any particular character finding a place in the inheritance (Nettleship).

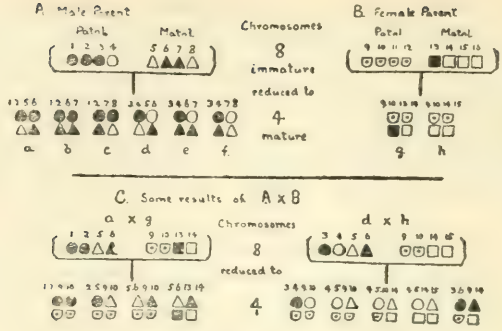


Fig. 15

A—represents the male parent ; his immature germ-cells have derived their chromosomes, germinal determinants or representative particles (Galton) from his father and mother, and they are respectively represented by different figures. The eight germ-mature chromosomes are reduced to four during maturation, two from each parent ; the figures a-f indicate the combination of two maternal with two paternal, all diseased, but in different degrees and modes. B—represents the female parent, in which there is an inherited taint, but only to a slight degree, coming from the maternal side ; in the mature germ-cells only one containing number 13 will be tainted. C—shows some of the results which may arise from the conjugation of A X B.

Certainly this idea of the scheme explains certain facts which have been observed in the pedigrees I have shown ; it shows why the offspring of parents derived from two tainted ancestral stocks are more likely to suffer with an intense form of the disease ; it shows also why more of the offspring are liable to be affected, and it shows why a certain proportion of the offspring may escape entirely ; but according to the hypothesis thus advanced it does not explain why only relatively few of the offspring are tainted as compared with the numbers born, even though there be convergent neuropathic inheritance, that is, the germinal determinants of both parents may be largely tainted and yet fewer offspring are affected by the disease than would be expected. In neuroses and psychoses it is not a disease that is transmitted but a predisposition or tendency, and some other factor than the inborn is required to produce the disease. If we ask ourselves the question : How could Nature best purify an unsound stock? the obvious answer would be to cause coalescence or crystallization out of the unsound germinal determinants into a few of the offspring, leaving the germ-plasm of the others free. This would not only purify the stock by segregation but by concentration in one or two offspring ; it would lead to intensification and anticipation of the disease. The diseased offspring would be unfit for the struggle for existence and propagation. In putting forward this coalescence theory of similar diseased germinal determinants, I may mention in support of it a statement made by Galton in his great work on Natural Inheritance. In the process of transmission by inheritance elements derived from the same ancestors are apt to appear in large groups, just as if they had clung together in the pre-embryonic stage, as perhaps they did.

Statistical Data Relating to Inheritance and Insanity, especially in Relation to Anticipation.

Six months ago data referring to 508 pairs of parent and offspring had been collected from the records of 464 insane parents whose 500 insane offspring have been also resident in the London County Asylums, and in these the age of the first attack has been ascertained.

Direct Heredity.

The following table is compiled from 217 pairs of father and offspring and 291 pairs of mother and offspring. The figures denote the percentage of cases whose first attack occurred within the given age periods.

Table I.

Age Periods.	Father.	Offspring.	Mother.	Offspring	
Under 20 years... ...	1·4	26·2	0·6	27·8	
20-24 ,, ...	0·4	18·0	3·4	15·7	Adolescence.
25-29 ,, ...	1·4	18·0	4·4	18·2	Adolescence.
30-34 ,, ...	9·6	13·0	7·8	13·4	Adolescence.
35-39 ,, ...	11·5	7·3	9·2	10·0	
40-44 ,, ...	9·2	6·4	10·3	5·8	
45-49 ,, ...	14·3	6·0	12·0	3·7	Involutional Period.
50-54 ,, ...	17·5	0·9	12·3	2·4	Involutional Period.
55-59 ,, ...	13·8	3·7	14·0	1·7	Involutional Period.
60-64 ,, ...	10·1	—	11·6	1·3	Involutional Period.
65-69 ,, ...	5·0	—	8·8	—	
70-74 ,, ...	4·6	0·4	3·1	—	
75-79 ,, ...	0·4	—	1·3	—	
80 ,, ...	0·4	—	0·6	—	

This table is represented graphically in the subjoined Figs. 16 and 17, the abscissae representing the age periods and the ordinates the percentage of cases whose age at the time of first attack falls within the given periods.

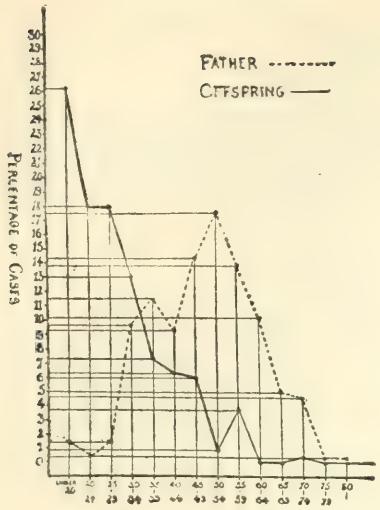


Fig. 16.

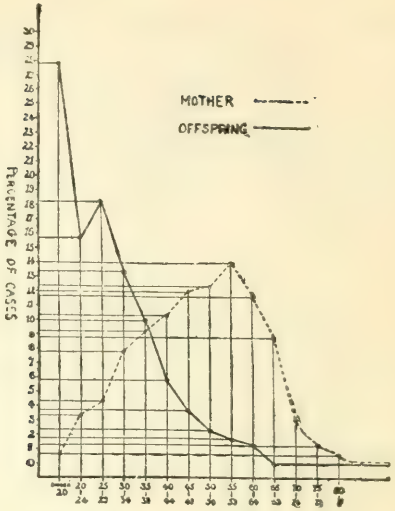


Fig. 17.

CURVES SHOWING ANTEDATING.

Figs. 16 & 17 represent diagrammatically the age incidence of first attack in parents and offspring. The first peak in the curve of the parent is due to the incidence of a larger number of cases of general paralysis in the male as compared with the female at this age period. It would be much more marked were it not for the fact that the cases of general paralysis among relatives are not numerous comparatively with other forms of insanity. This is as we should expect, for it is an acquired disease, and heredity plays a far less important part in its etiology than in the true insanities. It will be observed that the parent curves, male and female, attain their maximum in the involutional period. There is an obvious difference in the male and female parent curves. There is a greater incidence of insane mothers under 30 than fathers; this is due to puerperal cases, of which there were a fair number. These figures (16 and 17) are constructed upon the data contained in Table I. The abscissae represent the age periods and the ordinates the percentages of cases whose ages at the time of attack is first given.

Collateral Heredity.

The following table is compiled from 193 pairs of uncles and aunts with nephews and nieces in which only collateral heredity is manifested, and 231 pairs of uncles and aunts with nieces or nephews, in which are included those instances where one or both parents of the nieces and nephews are also insane. The figures denote the percentage of cases whose first attack occurred within the given age periods.

TABLE II.

Age Periods.	Collateral Only.		Collateral and Direct.	
	Uncle or Aunt.	Niece or Nephew.	Uncle or Aunt.	Niece or Nephew.
Under 20 years	5·2	20·7	5·2	25·5
20-24 ,,	3·1	19·2	3·4	17·7
25-29 ,,	6·2	18·6	7·8	19·0
30-34 ,,	12·9	17·1	14·3	15·1
35-39 ,,	11·9	12·4	12·1	11·2
40-44 ,,	11·3	12·4	10·4	4·3
45-49 ,,	12·4	2·1	12·1	2·6
50-54 ,,	14·5	2·1	2·1	1·7
55-59 ,,	7·7	1·5	8·6	2·1
60-64 ,,	8·8	—	8·2	—
65-69 ,,	1·5	0·5	1·7	0·4
70-74 ,,	1·0	—	1·3	—
75-79 ,,	3·1	—	2·6	—
80 ,,	—	—	—	—

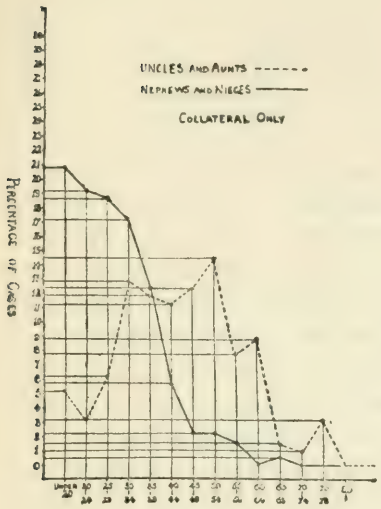


Fig. 18

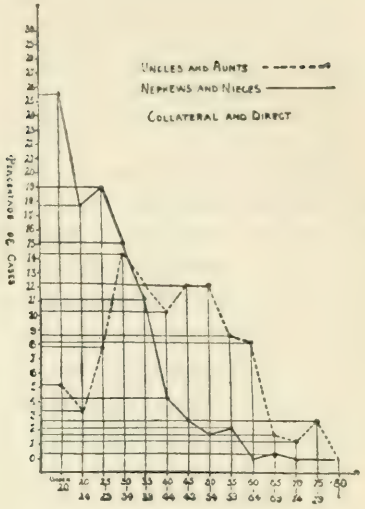


Fig. 19

Fig. 18 shows the curves of uncles and aunts and nephews and nieces constructed from the percentages in Table II. Fig. 19 shows the curves of uncles and aunts and nephews and nieces, including those cases where one of the parents was also insane, so that there is direct and collateral heredity. It will be observed that there is a considerable difference in the offspring curves. When there is only collateral heredity there are a far larger number of offspring in which the first attack occurred in the later periods of life. There is antedating, but it is not nearly so marked as is shown in Fig. 19; nor is it nearly so marked as in parents and offspring, Figs. 16 and 17. These figures are constructed from the data contained in Table II.

This tendency of certain diseases to occur at an earlier age in the offspring of diseased parents was termed by Darwin "antedating" or "anticipation," and I have found, as the above statistics show, that there is a singular tendency in the insane offspring of insane parents for the insanity to occur at an earlier age and in a more intense form, either as congenital imbecility or the primary dementia of adolescence, an incurable disease; not that all the cases are of this nature, but a large proportion of them. First let me call attention to certain facts regarding the age at first attack in 508 pairs of parents and offspring. Some of the parents had more than one insane offspring; there were only 464 parents. You will observe that 47·8% of the 500 offspring had their first attack at or before the age of 25 years, and as you see in the curves of parents

and offspring the liability to the child of an insane parent becoming insane tends rapidly to fall. (Figs. 16 and 17.) Now, besides the fact that this shows Nature's method of eliminating unsound elements of a stock, it has another important bearing, for it shows that after 25 there is a greatly decreasing liability of the offspring of insane parents to become insane, and therefore in the question of advising marriage of the offspring of an insane parent is of great importance. Sir Geo. Savage recently said that this statistical proof entirely accorded with his own experiences, and that if an individual who had an hereditary history had passed 25 and never previously shown any signs he would probably be free, and he would recommend marriage.

Another important fact was elicited, viz., that in 58·8% of the 508 offspring of insane parents the first attack in the offspring occurred at an age 20 or more years earlier than in the parent. Similar tables and curves (Figs. 18 and 19) compiled from 193 pairs of uncles or aunts and nephews and nieces show the same fact but not to so marked a degree.

As a leading article in a recent number of the *British Medical Journal* refers to this question of anticipation tending to the ending or mending of a degenerate stock being used as an argument against measures being taken to prevent the propagation of the unfit, I particularly desire to impress upon my audience the fact that I have always laid great stress upon the necessity of segregating congenital imbeciles now that Nature, by man's aid, does not kill them off as formerly. Moreover, it is highly desirable to follow up those members of the family who are sane, and particularly those who are discharged as cured, in order to see whether Nature has really mended that degenerate stock.

Recurrent Insanity and Propagation.

One of the great arguments advanced for sterilization has been that recurrent cases of insanity breed lunatics between their respective dates of admissions to asylums. I have no doubt this is the case, but before Parliament would consider such a procedure it would require the strongest and soundest evidence that life segregation or sterilisation would appreciably diminish the numbers of the insane.

I have endeavoured to ascertain some facts relating to this question. The inference that can be drawn is that about one-fifth of the recurrent cases or approximately one-twentieth of the female admissions have children after their first attack of insanity and of 31 such cases examined, 73 children were born after the first attack of insanity in the parent. A number of these were cases of puerperal insanity. I am unable to give exact figures as to the fate of these children, but a good proportion of them died in infancy, and the majority of them would be too young to decide which might become insane.

Recurrent insanity and epilepsy, with which it is closely allied, in relation to hereditary transmission, is one of the most important problems requiring scientific investigation by complete family histories and construction of pedigrees, and I can conceive no more important work on the relation of heredity to insanity than the following up, systematically, the history of children born in the sane intervals of cases admitted to the asylum and subsequently discharged.

From the statistics of relatives a computation has been made of the proportion of offspring who were born after the the first attack of insanity in the parent; it was found that 46 offspring out of 581 were born after the first attack of insanity in the parent, *i.e.*, 7·9%. That is to say, in the case of 529 insane parents, the birth of only one-twelfth of their 590 offspring would have been prevented by sterilization or life segregation of the parent after the first attack of insanity. These figures refer to the offspring which become insane, but there are a large number of offspring who do not become insane, and these would be cut off if life segregation or sterilization were adopted.

Single and Dual Neuropathic Inheritance.

Every pedigree is a study in itself and occupies a whole book if systematically carried out as regards inheritance of characters, and the classification of the same is a matter of considerable difficulty. We have not enough systematic pedigrees yet to form precise data and conclusions upon, but perhaps I may be permitted to refer to indications from the examination of pedigrees of three generations which I have obtained myself and combined with those obtained by Dr. Wilson White and Dr. Daniel. I will divide them into two groups :—

Group 1. Those with a double pathological inheritance, that is, both ancestral stocks show insanity, feeble-mindedness, drunkenness, epilepsy, suicide, or nervous disease of various kinds, direct or collateral, within two generations. In these 18 families there were 116 children born alive, and 100 reached adolescence, and among them were 39 insane, suicides, or sufferers with nervous disease, and 61 apparently normal. Thus 39% of the offspring reaching adult age were affected. But these are probably selected pedigrees, and are not numerous enough to draw definite conclusions from.

Group 2, in which there was an insane inheritance on one side only. Ninety families were examined. Of 384 children born alive 40 died in early life; there were 33 insane, suicide, or nervous disease, and 311 normal. Thus 9·6% of the offspring reaching adult age were affected.

The conclusion which possibly might be drawn is that a child born of a dual neuropathic inheritance stands on an average a chance of being insane four times as great as where only one stock is infected. This, however, applies to the mass and not the individual.

It might be argued that there are a certain number of imbeciles who could be allowed all social privileges excepting reproduction; this would

be on the ground that they could pick up a living, and sterilization would in no way interfere with their doing this. The objections are: The cry of one law for the rich and another for the poor; and the legalisation of an operation that is fraught with many hidden social dangers. I often think that a number of people who are crying out about the monetary burden of supporting the unfit are themselves not doing their duty to the race. Many have no children or they restrict the births; moreover, one does not find the numbers in a family increase with the income. When *hereditary health* as shown by longevity, fertility, and mental stability in a stock is regarded as a greater asset for happiness in the family and the nation than hereditary wealth, then will be the time for the rich and comparatively prosperous to suggest the desirability of sterilization of the insane *pauper*. For no one supposes that it would be carried out in all classes.

QUELQUES CONSIDERATIONS SUR LES ENFANTS "ARRIERES."

Par M. le Docteur RAOUL DUPUY,

Paris.

Que doit-on entendre par arriération—Arriérés atrophiques et dystrophiques—Etiologie—Les anomalies somatiques, psychiques, et sensorielles des dystrophiques—Diagnostic différentiel—Traitement des arriérés dystrophiques.

Le nombre des enfants anormaux—êtres difformes, futurs criminels, aliénés, prostituées, etc. . . . augmente de jour en jour, compromettant l'avenir du pays, de la société et de la race.

Ces sujets, victimes inconscientes d'une injuste fatalité, sont-ils un tribut que nous payons à notre civilisation? Sont-ils un indice de la décadence prochaine?

En tout cas, la collectivité, au lieu de tenter de les éduquer sans grand résultat (écoles spéciales d'arriérés) a le devoir de rechercher les causes qui provoquent cet état. Elle doit en plus traiter ces sujets, dont certains—les enfants *arriérés dystrophiques sont* des malades corporels, susceptibles d'être améliorés et même de revenir à la normale . . .

L'étude des anomalies qui constituent l'enfance " arriérée " est des plus complexe, car elle embrasse toute la pathologie.

En effet, on ne doit pas seulement—à l'exemple des neurologistes et des pédagogues—qualifier " d'arriérés " les enfants présentant uniquement de

la déficience intellectuelle, mais il faut également considérer comme tels ceux qui, soit isolément, soit simultanément, ont un retard, un arrêt ou une régression aussi bien dans leur évolution corporelle et sensorielle, que psychique.

D'autre part, si l'on considère que ces sujets sont en période de croissance, c'est à-dire en état d'instabilité biologique, si l'on remarque aussi que les types d'anomalies si variés,—à tel point que chaque arriéré considéré dans son ensemble, constitue un *type clinique spécial*, qu'il est à peu près impossible de faire entrer dans une classification générale—on se rendra compte des difficultés que l'on éprouve, pour donner une idée d'ensemble sur la question.

Pour pouvoir juger un enfant arriéré, on doit tenir compte de son âge et procéder par comparaison.

Est arriéré, tout enfant qui, pour un âge donné, présente un retard corporel, psychique ou sensoriel, sur des sujets du même âge.

Le nouveau-né a une vie *végétative*. Le nourrisson a une vie *animale*, qui devient *humaine* dès qu'il est doué de pensée et de parole. La puberté apparaît ensuite; le sujet est alors capable de se reproduire.

Que d'étapes l'enfant doit il traverser pour arriver à la nubilité!

Or, à chacune de ces étapes correspond toute une série de troubles de l'évolution qui peuvent intéresser soit totalement, soit partiellement le sujet.

L'arriération en est le plus important, mais il existe aussi un état caractérisé par de l'*exagération* et de l'*inversion* que l'on qualifie de *perversion* et de *déviation*.

Les arriérés proprement dits ne représentent donc qu'un certain nombre des enfants anormaux; les autres sont les *pervertis*, les *déviés*.

Comme l'arriération, la perversion est corporelle, psychique ou sensorielle, ellle peut être complète—éventualité rare—ou partielle et n'intéresser qu'un système, qu'un organe, qu'une faculté, ou qu'un sens: C'est le cas des géants, des macropéniens, des " prodiges " de musique ou de mémoire, de certains déments précoces, des invertis sexuels, etc. . . .

Mais bien souvent, l'arriération s'accompagne de perversion ou est causée par elle, si bien que l'arriération infantile—telle que nous la concevons aujourd'hui—est un état mixte. Elle n'est pas simplement un arrêt, un retard ou une régression, une " immaturité " mais un *déséquilibre*, une *dysharmonie* de l'évolution.

Les causes de l'arriération infantile sont multiples.

Cet état peut être congénital ou acquis; parfois il est mixte.

Il est *congénital* par suite d'un affaiblissement du germe des générateurs (sénilité, grossesses multiples, alcoolisme, syphilis, tuberculose, misère physiologique, paludisme, arthritisme, état névropathique, etc. . . .) Il est *acquis* par suite de maladies de l'embryon, de traumatismes abdominaux, ou de fatigues de la mère pendant la grossesse, d'accouchement

prématuré, de dystocie maternelle ou foetale, des infections de l'enfance, de croissance trop rapide, de mauvaise alimentation (entérite), etc. . . .

Nous insisterons tout particulièrement sur ce fait c'est que l'arriération infantile—qu'elle soit congénitale ou acquise—est provoquée par des *troubles* ou des *lésions* qui intéressent soit le système nerveux et la moelle, soit une ou plusieurs glandes internes (glandes endocrines: glandes thyro-parathyroïdes, hypophyses, surrénales, génitales—partie interstitielle du testicule et corps jaune de l'ovaire.

Il y a lieu de différencier tout d'abord les troubles des lésions.

Les troubles sont des perturbations d'ordre physiologique qui peuvent être modifiées. Les lésions qui correspondent habituellement à de la sclérose, sont immuables.

Si les lésions ont atteint le cerveau (encéphalopathies plus ou moins généralisées) ou la moelle (myelites), les types qui en sont la conséquence sont les *arriérés atrophiques*, malades incurables en l'état actuel de la science, certains syphilitiques exceptés. Ce sont les paralytiques, les hémiplégiques, certains littliques et epileptiques, les sourds-muets et les aveugles d'origine centrale, certains hydrocéphales et microcéphales, etc. . .

Dans tous les autres cas d'arriération, qu'il y ait lésion des glandes à sécrétion interne ou troubles cérébraux et médullaires par intoxication ou manque d'influx excito-moteur et troubles endocriniens par hypo ou hyperfonctionnement de ces glandes, on est en présence *d'arriérés dystrophiques* qui doivent être plus ou moins améliorés. En effet, les intoxications sont modifiées par un régime approprié et les troubles secrétoires des endocrines par l'opothérapie endocrinienne.

Aux deux groupes d'arriérés: atrophiques et dystrophiques, on doit ajouter les *arriérés-mixtes*, mi cérébraux, mi endocriniens, susceptibles également de modifications, et qui sont assurément plus nombreux qu'on le croit.

Nous ne nous attarderons pas à l'étude des arriérés *atrophiques purs* qui, s'ils présentent un intérêt scientifique, ne peuvent guère être améliorés par la thérapeutique médicale proprement dite.

Les arriérés dystrophiques ou mixtes—sujets curables—méritent d'attirer l'attention de tous les praticiens. Aussi, malgré la complexité de leurs manifestations, allons-nous essayer d'indiquer succinctement leurs différentes tares corporelles, psychiques ou sensorielles, que nous envisagerons séparément pour la commodité de la description, tout en stipulant que ces anomalies sont la plupart du temps associées dans des proportions qui varient avec chaque sujet.

Les *anomalies corporelles* peuvent intéresser soit l'organisme tout entier, soit un ou plusieurs systèmes, voire même un seul organe, créant ultérieurement un état d'infantilisme complet et incomplet (Herthoge).

Les anomalies sont d'ordre anatomique et physiologique.

Pour le système osseux—siège habituel de dystrophies—les troubles portent sur la vitalité (ostéoporose), la forme, les dimensions, le processus de soudure et de calcification (rachitisme). L'arrêt, et le retard se manifestent par la petitesse des os en général.

L'anomalie peut être totale (nanisme) ou partielle (ectromélie et micromélie humérale par exemple). Et comme dans tout état d'arriération, on recontre, comme nous l'avons dit précédemment de la perversion et de la déviation, on note souvent chez des sujets, arriérés par ailleurs, du gigantisme total ou partiel (extrémités surtout), des disproportions et même des types de malformations identiques à celles de l'acromégalie.

Le caractère commun qu'ont tous les os longs des arriérés—qu'il y ait perversion ou arriération—c'est de présenter un *retard de l'ossification* que l'on peut constater à la radiographie.

Par contre, les os plats—ceux du crâne par exemple—se soudent parfois trop rapidement sans que l'on puisse trouver de lésions des méninges ayant activé ce travail de suture précoce.

Les muscles se comportent comme les os. On les note soit en état d'atrophie (éminence thénar, région fessière, muscles vertébraux, muscles des membres), soit en état d'hypertrophie ou de myooëdeme comme pour ceux de la langue. Considérés au point de vue de leur tonicité, ils sont hypo ou hypertoniques, et si l'on ajoute à cet état le relâchment ou la contracture des ligaments et des aponévroses, on comprendra aisément pourquoi la station debout et la marche sont parfois difficiles chez ces sujets.

Les uns sont de véritables " enfants en caoutchouc " (hernies ombilicales et inguinales fréquentes) qui peuvent reprendre la position foetale en se repliant sur eux-mêmes; les autres sont des " automates " dont la raideur est marquée.

Ainsi s'explique la pathogénie de certaines malformations: pied plat, pied bot, genu valgum, dans lesquelles en plus des dystrophies osseuses diaphysoépiphysaires, il y a dysharmonie entre les ligaments et les muscles antagonistes qui les uns sont relâchés et les autres contracturés.

Du côté des *articulations*, on note des luxations congénitales par suite de non terminaison des cavités articulaires et de laxité des ligaments. Les raideurs articulaires par suite de retraction ligamentaire et musculaire donnent souvent l'impression d'ankyloses. Nous avons noté ce phénomène au niveau de l'articulation radio-cubitale supérieure; ce trouble empêche complètement les mouvements de pronation et de supination.

C'est par ce processus d'hypo et d'hypertonie que se produisent les déviations de la colonne vertébrale (scoliose, lordose) qui sont relativement fréquentes. De même, il faut indiquer les attitudes vicieuses de la tête sur le tronc, qui paraissent avoir la même origine.

Souvent, il suffit de voir marcher ou courir ces enfants, la tête en avant, les bras en arrière, monter et surtout descendre un escalier pour faire un diagnostic d'arriération, tant leur démarche est spéciale.

Leur *circulation* est toujours défectueuse. Leur coeur, outre les malformations (persistance du trou de Botal, rétrécissement mitral), manque de tonicité : la basse tension artérielle en est un indice. Il se trouve déréglé dans son rythme (tachycardie, embryocardie, intermittences).

Les artères sont petites, dures et peu élastiques. Cet état favorise la baisse de la pression et explique la différence parfois nulle (que l'on constate à l'oscillomètre de Pachon) entre la tension maxima et minima d'une artère. Il y a " anangioplasie " comme disait Brissaud. Leur pression varie entre 5° et 10° suivant leur état et leur âge.

Les veines sont ou indurées ou atoniques. Ce fait explique les stases sanguines, les varices et la mauvaise circulation de retour. Les capillaires sont donc obstrués : la nutrition, la respiration tissulaires et la température du sujet se ressentent fatalement de cet état (engelures, troubles trophiques, hypothermie, congestion et asphyxie des extrémités, sensation de froid habituelle, etc. . . .).

Le sang a une composition anormale. Il est pauvre en sels de chaux (hémophilie ?). Il présente de l'hypoglobulie (anémie, souffle mésosystolique extra-cardiaque) et de l'hyperleucocytose. Le taux de l'hémoglobine est diminué. Cette hyperleucocytose mérite d'attirer l'attention. Peut-elle donner l'explication de l'immunité quasi habituelle de ces sujets vis à vis des maladies infectieuses de l'enfance ?

Ce lymphatisme s'accompagne d'hypertrophie des organes lymphoïdes (végétations adénoïdes) qui produisent les désordres que l'on sait.

Les anomalies du *système nerveux* sont très nombreuses. Elles consistent tout d'abord en malformations de la boite crânienne qui donnent naissance à une quantité de types : plagiocéphalie, scaphocéphalie, brachycéphalie, oxycéphalie, trigonocéphalie, platicéphalie, acrocéphalie, hydrocéphalie, macrocéphalie, microcéphalie, etc. . . . qui ont été bien étudiés. On constate pour le cerveau une augmentation ou une diminution de la substance cérébrale totale. Les dystrophies les plus fréquentes sont l'agénésie de certains lobules, la minceur de la couche corticale, le peu de profondeur des sillons. La moelle allongée et la protubérance sont peu développées.

A l'examen microscopique, on est frappé souvent de la raréfaction des cellules nerveuses et des vaisseaux sanguins.

Nombre de ces enfants ayant présenté des manifestations d'hystérie et d'épilépsie ou ayant eu des convulsions n'ont pas trace de lésions cérébro spinales.

Les *glandes à sécrétion interne* (endocrines) sont ou absentes, ou sclérosées, ou rudimentaires, ou en état d'hypertrophie adénomateuse. L'hypertrophie hypophysaire s'accompagne souvent d'élargissement de la selle turcique. Parfois ces glandes paraissent normales, mais elles n'ont pas été étudiées du point de vue chimique . . . . On note aussi la persistance du thymus.

Si l'on passe en revue les différents appareils, on constate qu'ils présentent tous ou de l'arriération ou de la perversion dans leur anatomie et dans leur fonctionnement.

Tube digestif.—Bouche: dentition retardée et incomplète, persistance des dents de lait —Carie dentaire—Implantation défectueuse par suite de mauvaise disposition de la voute palatine (ogivale, abaissée, maxillaires rétrécis)—Macro et microdentisme, dents d'Hutchinson, etc. Lèvres épaisses ou pincées—Bec de lièvre. Langue: énorme, longue, fissurée Insertion vicieuse du frein.

Glandes salivaires: Hypo et surtout hypersécrétion (bave).

Estomac et intestin: Dilatation gastrique—Rumination. Constipation opiniâtre—Entérite—Insuffisance hépatique (teint subictérique), etc. . . .

Assimilation.—L'assimilation est toujours défectueuse. L'examen des urines le démontrera ultérieurement. Souvent ces enfants présentent du ralentissement de la nutrition caractérisé par l'obésité, le myxoedème, le rhumatisme, etc. . . .

Appareil respiratoire.—Larynx: voix eunuchoïde ou caverneuse.

Poumons et bronches: Emphysème et bronchites chroniques.

Appareil urinaire.—Reins multilobés—Atonie des sphincters (incontinence diurne des urines) Epi et hypospadias.

L'examen des urines est des plus intéressants. Il révèle la présence d'indican en abondance, d'albumine en petite quantité, d'urobiline, de pigments biliaires, de scatol. Ces sujets sont donc des *intoxiqués.* De plus, on remarque une rétention ou une hyperexcrétion des substances contenues normalement dans l'urine (Eau, Chlorures, Phosphates, Sels de chaux, Acide urique, Urée). Ces constatations indiquent donc qu'il y a ou *ralentissement de la nutrition* ou *déminéralisation.* La rétention des chlorures en particulier correspond à un état d'asthénie que nous étudierons plus loin; l'hyperexcrétion chlorurée correspond au contraire à un état d'instabilité et se rencontre parfois dans certaines formes d'épilepsie.

L'appareil génital est pour ainsi dire toujours dystrophié. On note de l'atrophie ou de l'hypertrophie des organes pelviens et externes—La cryptorchidie simple ou double est fréquente—On doit également signaler l'atrophie ou l'hypertrophie mammaire. Ces troubles corporels s'accompagnent d'une avance ou d'un retard de la puberté; dans le second cas, les sujets présentent souvent par ailleurs des stigmates corporels, psychiques et sensoriels d'*inversion sexuelle.*

Les anomalies du *système cutané* se caractérisent soit par l'épaisseur, la sécheresse, la rugosité des téguments soit par une minceur et une finesse extraordinaire de la peau—On note ou de la congestion ou de l'anémie. Les réflexes sont ou absents ou exagérés. La peau est souvent le siège d'affections spéciales (dermatoses). Le *système pileux* presente des particularités

intéressantes. Les poils et les cheveux sont ou abondants ou rares. Leur constitution et leur aspect sont très différents (gros, fins, friables, ternes, courts, etc. . . .).

Le sommeil est ou trop profond (incontinence nocturne d'urine) et long ou léger, agité et court—Somnambulisme.

Les réflexes peuveut être ou abolis, ou exagérés ou même parfois normaux.

Le *facies* des arriérés présente des anomalies très nombreuses des organes qui le composent. Nous énumèrerons plus loin ces dystrophies en étudiant les organes des sens. Considéré dans son ensemble, il peut être bouffi, lunaire avec des joues vultueuses et des lèvres saillantes, il n'a dans ce cas aucune expression du fait de son immobilité. Parfois, au contraire, il est maigre et grimaçant; sa mobilité est extraordinaire.

L'asymétrie et le prognatisme sont frequents.

Les paralysies periphériques se recontrent parfois.

En résumé, considérés du point de vue somatique, les enfants arriérés ne peuvent être classés comme nous l'avons dit précédémment, cependant certains correspondent à des types cliniques—bien artificiels, il est vrai—et qui peuvent être étiquetés: myxoedemateux, mongoliens, invertis sexuels, obèses génito-dystrophiques, négroïdes, achondroplases, nains type Lorrain, foetoïdes, géants, acromégalo-rachitiques, dystrophiques crâniens, impubères, etc., etc. . . . Cette liste pourrait être fort longue. . . .

Une dystrophie corporelle, qui s'accompagne souvent d'arriération psychique ou sensorielle, et caractérisée par une *sénilité précoce* (progoeria) mérite une place spéciale dans l'énumeration. Elle indique une fois de plus que l'état d'arriération est mixte, qu'il comporte des retards et des perversions de l'évolution.

Les *anomalies psychiques* ont surtout attiré l'attention des pédagogues et des neurologistes. Ce sont celles dont les parents s'aperçoivent et pour lesquelles ils viennent consulter. Ce fait nous explique pourquoi le termel "arriéré" est appliqué—à tort—par nombre d'auteurs, uniquement pour désigner des sujets qui ont de la déficience intellectuelle.

Les tares psychiques comme les tares corporelles consistent en retards, arrêts, régressions, mais aussi en perversions de la faculté.

Chez ce sujets, le jugement, la réflexion, le sens moral, la coordination des idées, la faculté de compréhension sont ou absents ou déformés. Par contre, on note fréquemment chez eux une appétence plus ou moins marquée pour telles ou telles branches de l'activité intellectuelle.

Les anomalies de la *volonté* permettent jusqu'à un certain point de diviser ces sujets. On rencontre en effet les abouliques, les asthéniques, les *apathiques* qui forment la première catégorie, et les *instables*, les agités qui ne peuvent *fixer leur attention*, qui rentrent dans le deuxième groupe.

Les anomalies de l'*instinct* sont également des plus fréquentes. Elles doivent se rencontrer plus ou moins combinées et nombreuses pour constituer un état d'arriération.

Instinct de conservation—Pusillanimité ou suicide;
Instinct de nutrition—Anorexie ou gloutonnerie;
Instinct de propriéte—Vol ou prodigalité;
Instinct de sociabilité—Egoïsme ou sentimentalité exagérée;
Instinct sexuel—Onanisme, Sadisme, Inversion sexuelle exhibitionnisme, etc., etc.

Les perversions de l'instinct produisent de nombreux troubles qui peuvent être tellement accentués qu'ils ne sont autres que de la démence. La limite entre l'état d'arrièration ou de perversion et l'état de folie est impossible à établir.

De plus les enfants arrièrés présentent de nombreux défauts du caractère qui les rendent insociables: ils sont brutaux envers les animaux, coléreux, enveux, jaloux, sales, timides, paresseux, désordonnés menteurs, bataileurs, etc., etc. . . . .

Les anomalies du *langage* se caracterisent par la *mutité* chez les sourds, par du *mutisme* et du *langage négre* chez les sujets qui manquent d'idéation. Le *bégaiement* indique un manque de coordination dans le fonctionnement des organes.

Les défauts de prononciation sont trés nombreux: ils sont rangés sous la dénomination de *blésité* qui consiste en la substitution, la suppression ou la déformation d'une lettre composant le mot. Les principaux types de blésité sont le:

Jotement—iapin pour lapin.
Chuintement—chauche pour sauce.
Grasseyement—Mahine pour marine.
Mytacisme—Batin pour matin, etc. . . . . .

Nombreux arriérés ont un *parler nasal* par déformation des sons vocaux ou nasaux.

Ces derniers troubles de la prononciation proviennent de la paresse ou du rétrécissement de la cavité buccale ou des dimensions exagérées ou des troubles moteurs de la langue.

Les troubles *de l'écriture* sont habituels, ils sont en rapport avec les perversions de la volonté.

L'écriture des apathiques est grosse, molle, ronde, souvent régulière, mais sans caratères, celle des instables est irrégulière, tremblante, saccadée. . . .

La *lecture* est souvent fort difficile. Certains enfants épèlent sans comprendre les sens du mot.

Dans l'écriture et dans la lecture, on rencontre toute un série de troubles qui sont compris dans l'aphasie: cécité verbale, agraphie, surdité verbale, etc.

La *mémoire* de ces sujets est habituellement extraordinaire, à tel point que certains arriérés se rapellent dix ou quinze ans après les lieux ou les

personnes qu'ils n'ont vus qu'une seule fois. Leur mémoire des dates est surprenante.

Certains de ces sujets présentent de véritables dons pour le calcul, la musique, l'imitation mimique ou parlée.

Leur *sensibilité affective* est souvent très développée, peut être parce que ils ont été l'objet de soins et d'attentions que n'ont pas les enfants normaux : pleurs faciles et sans raison.

Les enfants arriérés ont presque tous des tics ou des manies, des phobies ; tics de Salam, echolalie, onychophagie, aérophagie, agoraphobie, stradaphobie, mouvements choréïques et contractions nerveuses plus ou moins localisées à certains groupes musculaires, etc. . . . .

En résumé, considéré au point de vue mental, l'enfant arriéré peut être ou un *idiot absolu* et quelque soit son âge, ses facultés intellectuelles correspondent à celles d'un enfant n'ayant pas dépassé 3 à 5 mois.

L'*idiot profond* correspond à un sujet normal de deux ans (Cruchet).

L'*imbécile* a une intelligence qui équivant à celle d'un enfant de 2 à 8 ans.

Le diagnostic des idioties et de l'imbécillité ne peut donc pas être fait à la naissance.

Le débile est un retardé qui sera toujours arriéré de 4 à 6 ans sur son âge véritable.

Les arriérés que l'on qualifie de *pédagogiques* et *scolaires* sont souvent des débiles, présentant une perversion de la volonté et de l'attention, qui constitue l'apathie et l'instabilité dont nous avons parlé précédemment.

Les anomalies *sensorielles* portent soit sur les organes des sens, soit sur la façon dont les sujets interprêtent la sensation. Dans les deux cas, on rencontre comme toujours de l'arriération et de la perversion.

Pour la *vue*, les anomalies intéressent les annexes de l'œil : les paupières, dont la fente palpébrale est disposée obliquement, comme dans le mongolisme, ou qui présentent une membrane accessoire (épicanthus), les glandes lacrymales qui sont en hypofonction (nombreux arriérés pleurent sans verser de larmes), les muscles moteurs qui manquent de coordination ou qui présentent des contractures passagères (strabisme et nystagmus intermittents).

L'œil est souvent en état d'exophtalmie. Les anomalies qui l'intéressent peuvent influencer toutes les membranes, surtout s'il y a arrêt dans son évolution (colobome par exemple).

Du côté de la rétine, on constate de la dystrophie papillaire par manque de vascularisation, provoquant même la cécité, qui peut persister pendant plusieurs mois du début de la vie.

L'iris est anormal par le manque de pigmentation et par l'incohérence des muscles qui l'animent, produisant des réactions paradoxales des pupilles :

pupille paresseuse, dilatée ou contracturée, privée de réflexes sans qu'une lésion cérébrale en soit la cause.

Chez nombre de ces enfants arriérés, l'œil est terne, le regard vague, sans expression, sans vie. Parfois au contraire, les yeux sont trop brillants; le regard est trop vif, trop perçant trop fixe.

Les vices de réfraction et la dyschromatopsie sont aussi des plus fréquents.

Les perversions de l'interprétation sont des plus nombreuses; la plupart de ces enfants ne peuvent pas reconnaître les couleurs, évaluer les distances et les dimensions des objets.

L'*ouïe* est anormale en ce sens que l'appareil auditif est incomplet (absence d'un osselet, malformation du tympan, atrophie des organes de Corti) et que l'acuité auditive est de ce fait amoindrie. La surdité a également une autre cause: la présence de végétations adénoïdes dans le pharynx, principalement au niveau de la fossette de Rosenmüller qui obstruent un des orifices de la trompe d'Eustache.

Par contre, nombreux arriérés présentent de l'hyperacousie, et ont un goût marqué pour le musique.

Nous ne parlerons pas des malformations du pavillon qui sont des plus connues (dimensions exagérées, mode d'implantation, dystrophies des lobes et du tubercule de Darwin, etc. . . . . .)

Le *goût* présente de nombreuses anomalies. L'atrophie des papilles explique pourquoi certains sujets sont incapables de discerner des mets différents. Les perversions sont fréquentes (salacité).

L'*odorat* a aussi ses anomalies. Sans parler des dystrophies externes du nez qui, avec la bouche bée, résultat d'une respiration défectueuse par les narines, complètent le portrait peu avantageux de l'arriéré, il faut mentionner les anomalies internes (malformations ou hypertrophies de cloisons, absence d'une narine, etc. . . .)

Chez certains, le sens olfactif est très diminué, chez d'autres au contraire, il est très développé (les flaireurs) et dans de nombreux cas, on constate aussi des signes de perversion dans l'interprétation de la sensation.

Aux anomalies du *toucher* se rattache l'étude de la main. Les mains des arriérés présentent des types variés: mains longues et effilées, mains courtes et grosses, mains rugueuses et violacées, mains carrées, mains en trident, mains d'anthropoïdes, etc. . . . Les mains des invertis sexuels hommes sont souvent identiques à celles des femmes (index plus long que l'annulaire.)

Comme pour les autres sens, on note de l'arriération et de la perversion: absence de sensibilité (brûlures fréquentes), impossibilité de reconnaître la forme de certains objets (notion du relief absente) ou la consistance de certaines étoffes, difficulté pour différencier le froid de la chaleur en un point donné, préhension difficile, maladresse, etc. . . .

Il est bon de faire remarquer qu'une déficience sensorielle est comme compensée par le développement extraordinaire d'un autre sens.

Les arriérés ont souvent des hallucinations sensorielles.

En résumé, il est bien difficile d'établir une classification des enfants arriérés basée sur leurs anomalies sensorielles, car les perversions sensorielles se recontrent chez des sujets très normaux par ailleurs. Les anomalies sensorielles à moins d'être complètes (aveugles et sourds-muets) ne sont que les compléments de l'arriération somatique et intellectuelle.

Le *diagnostic* de l'arriération infantile ne présente pas grande difficulté. L'évaluation du retard est plus délicate ; mais plus difficile encore est le diagnostic de la cause. L'arriération est-elle d'origine cérébrale ou endocrinienne ?

Si elle est d'origine cérébrale, y a-t-il lésion, troubles physiologiques ou intoxication ?

Il est donc nécessaire de s'entourer de renseignements précis sur l'évolution du sujet.

Etait-il venu à terme ? Etait-il normal à la naissance ? A-t-il présenté des symptômes de méningisme ? A quel moment a-t-il fait sa dentition ? A quel moment a-t-il parlé ? marché ? Chez un sujet plus âgé, à quel moment est apparue la puberté ? A la suite de quel incident a-t-on constaté un arrêt du developpement corporel de intellectuel ?

Souvent les renseignements manquent ; le médecin en est réduit à des suppositions. Les parents, dont l'amour est aveugle, ne se sont pas rendu compte de l'état de leur enfant, ou ne se souviennent pas.

On pourra se baser sur l'état du pouls, de la pression artérielle, sur l'examen des urines, la radiographie des os, etc. Ces différentes pratiques ne donnent pas de certitude.

Seul le traitement *opothérapique* et *médicamenteux combiné*, véritable " pierre de touche " donne des renseignements par les résultats que l'on en obtient. Il échoue dans les cas de lésion cérébrale pure, c'est-à-dire dans les cas d'arriération atrophique mais il amène des modifications notables dans les formes mixtes ou dystrophiques.

Le traitement des arriérés dystrophiques repose sur les constatations de l'examen.

Ce sont des sujets *intoxiqués* qui sont ou *retentionnistes* ou *déminéralisés*, qui ont de l'*anémie*, de l'*hyperleucocytose* et une *hypotension artérielle* habituelle. Ces particularités sont de règle, quelle que soit la prédominance de l'arriération (somatique ou psychique).

Des états différents "a priori" relèvent donc de mêmes causes. C'est pourquoi le traitement que nous indiquons donne des résultats dans des cas très variés par leurs manifestations.

Nous ne parlerons pas du *traitement prophylactique* qui découle des causes de l'arriération que nous avons indiquées, mais nous insisterons en passant sur l'importance de la vulgarisation de la Puériculture du premier âge.

Le *traitement effectif* doit être précédé de l'ablation des végétations adénoïdes qui sont une gêne pour la respiration et pour l'hématose et qui en plus-organes lymphoïdes-entretiennent l'hyperleucocytose. On procédera aussi à l'examen des yeux, et le port de lunettes sera exigé si le sujet présente la moindre anomalie de réfraction qui, non corrigée, entretient l'arriération.

La nourriture sera saine et suffisante : la constipation sera traitée. Le *sommeil* et le repos au lit seront longs.

La *cure* comprend la *réminéralisation* qui sera obtenue par l'administration des glycerophosphates de chaux, soude, potasse, magnésie, fer, qui seront fixés et transformés dans l'organisme par l'opothérapie endocrinienne.

On doit attendre deux actions de l'opothérapie endocrinienne :

1° une action générale donnée par le corps thyroïde,

2° une action spéciale donnée par chacune des endocrines en particulier.

L'action générale du corps thyroïde est indéniable,car cette glande,véritable soleil de l'organisme, a une action excito-motrice sur toute l'économie, en activant toutes les sécrétions externes et internes endormies.

Mais s'il y a hypofonction totale, ou presque totale, d'une autre endocrine autre que la thyroïde : hypophyse surrénale, glandes génitales—c'est le cas habiteul chez les enfants arriérés—l'opothérapie thyroïdienne ne peut plus exciter la secrétion d'un organe quasi détruit ou absent. Pour avoir un résultat on est obligé de s'adresser aux autres extraits endocriniens—tirés des animaux : mouton, porc, taureau,—dont l'administration nécessite une technique spéciale.

Les extraits endocriniens doivent être donnés à faible dose (de 0,02 à 0,05 c.g. par jour pour tous les extraits, sauf pour l'extrait génital 0,10 c.g.).

Ils doivent être *associés* ou *alternés fréquemment.*

Le meilleur mode d'administration est la *voie intra-musculaire* (extraits glycérinés préparés à froid par macération et expression). La voie gastrique ne doit être utilisée que quand on ne peut pas faire autrement.

On ne doit utiliser que les *extraits totaux* et non pas les preparations qui ne contiennent que les principes actifs.

La traitement dure habituellement plusieurs mois, voire même des années. Il sera institué en séries de 20 à 30 jours, qui seront espacées de 15 à 20 jours.

Avec les doses que nous indiquons, il n'y a pas d'accidents à craindre. Le cœur sera simplement ausculté fréquemment. Quant aux piqûres, si elles sont faites profondément et si l'extrait a été préparé par un làboratoire serieux, elles sont à peu près indolores et ne nous ont jamais donné d'abcès.

Le traitement opothérapique endocrinien sera complété par l'opothérapie *hepatique* et *splénique* dans les formes graves de denutrition, par l'opothérapie médullaire : moelle osseuse fraiche de bœuf (que l'on étend sur une tranche de pain), par l'absorption d'extraits de foies de morue, par des bains sallés, des bains de warech, des frictions alcoolisées. Les massages généraux et la gymnastique seront également prescrits, carleur action stimulante et sédative est un adjuvant précieux du traitement.

Nous dirons en passant que quel que soit le degré d'agitation et d'instabilité, nous déconseillons le bromure sous n'importe quelle forme, car s'il calme momentanément, il amoindrit pour longtemps les facultés cérébrales.

Comment expliquer l'action de l'opothérapie endocrinienne associée? Son action est nettement substitutive, et cette médication agit par suppléance ou par antagonisme.

Les troubles physio-pathologiques que nous avons énumérés précédemment sont des anomalies de fonctionnement du sympathique—ce grand régulateur de l'organisme—dont les endocrines ne sont que relais excito-moteurs; aussi, les extraits de glandes internes doivent-ils agir surtout par son intermédiaire.

L'hypophyse et la surrénale ne sont-elles pas hypertensives?

Les glandes génitales et la thyroïde ne sont-elles pas hypotensives, c'est-à-dire antagonistes des précédentes?

D'autre part, ces glandes internes ont une action indéniable sur l'assimilation. Manutentionnaires vigilantes, elles réglent l'une le métabolisme des hydrates de carbone (hypophyse), l'autre des matières azotées (thyroïde), l'autre des sels minéraux : chaux (surrénale) chlorures et phosphates (glandes génitales?)

De plus, elles auraient une action au moment de la formation du sexe et par la suite en compléteraient les caractères (surrénales—mâles et hypophyse—femelle).

Chaque glande enfin aurait sa part dans les dystrophies des systèmes et nous nous demandons si chacune des glandes ou plus exactement chacune des deux parties connues constituant chaque glande n'aurait pas une action sur l'évolution des feuillets primitifs du blastoderme et si l'ectoderme, le mésoderme et l'endoderme ne sont pas activés spécialement, ou tout au moins influencés par telle ou telle glande interne dont les sécrétions paraissent constituer de l'énergie vitale.

Les *résultats* de l'opothérapie endocrinienne associée sont des plus encourageants, parfois même ils ont dépassé les espérances, tant les modifications ont été appréciables.

Les grands facteurs de succès sont le jeune âge du sujet, la patience du thérapeute et la constance des parents.

Sur 150 cas que nous avons étudiés et suivis, nous n'avons jamais eu d'insuccès. On a toujours constaté des modifications plus ou moins appréciables, excepté toutefois dans des cas où les sujets étaient trop âgés. Et pour l'instant, nous n'avons en vue que l'état mental, car l'opothérapie peut produire des changements dans l'état somatique même à un âge avancé: à la nubilité par exemple.

Le Dr. Edmond Perrier, à deux reprises, a communiqué nos résultats à l'Académie des Sciences (janvier et avril 1912). Parmi les observations auxquelles il faisait allusion, il se trouvait des cas traités par le corps thyroïde depuis fort longtemps—et ceci sans résultat.

Après l'administration de l'opothérapie endocrinienne associée, on remarque:

1°—Augmentation de la taille sans amaigrissement notable.

2°—Augmentation très nette de la pression artérielle (4° à 5° en quelques) semaines) et de la chaleur animale; diminution des battements cardiaques.

3°—Modification rapide de l'élimination urinaire qui indique que le sujet se désintoxique, et que le métabolisme tend à devenir normal.

4°—Atténuation et guérison d'anomalies d'ordre sympathique ou reflexe: achroasphyxie, troubles de la vue, ptoses viscérales, incontinence nocturne d'urine, etc. . . . . .

5°—Métamorphose physique du sujet, qui porte sur chaque appareil en particulier, et surtout sur le système génital (apparition de la puberté).

6°—Métamorphose intellectuelle par développement de l'idéation, du raisonnement, de la coordination des idées; l'asthénie et l'excitation cérébrales se modifient; l'attention et l'activité intellectuelles augmentent. Ces sujets font souvent des progrès rapides à l'école, et sont capables de tenir par la suite une petite place dans la société, de faire un métier, et ils deviennent souvent d'excellents ouvriers.

Il est bien certain que les enfants arriérés qui présentent des anomalies intellectuelles doivent recevoir un enseignement spécial, et ceci dans des *écoles autonomes* avec système d'internat.

Dans ces écoles, le médecin devrait avoir le tâche prépondérante, car tous ces sujets arriérés intellectuels sont souvent des *malades corporels* que l'on doit soigner d'abord, et éduquer ensuite.

Nous ne parlerons pas de la pédagogie appliquée aux arriérés: cette question a déjà été longuement traitée par des auteurs plus autorisés que nous, mais nous ne saurions terminer ces quelques notes sans affirmer que pour faire œuvre utile, le pédagogue doit être le collaborateur et l'ami du médecin.

CONCLUSIONS.

1°—Les enfants arriérés présentent, simultanément ou isolément, des arrêts ou des retards dans leur évolution corporelle et intellectuelle et dans leurs aptitudes sensorielles.

2°—Ces anomalies proviennent de deux origines : lésions cérébrales incurables souvent (arriérés atrophiques) ou lésions et fonctionnement anormal des glandes à sécretion interne avec retentisement sympathique (arriérés dystrophiques—sujets curables).

3°—Les formes d'anomalies des dystrophiques sont des plus variées : somatiques, psychiques ou sensorielles, outre l'arriération elles s'accompagnent de perversion.

4°—Le diagnostic du type de l'arriération est fort délicat, il n'est souvent fait que par le traitement opothérapique qui est comme un spécifique de cette " immaturité " de l'individu (Dystrophiques).

5°—Le traitement opothérapique endocrinien associé produit des modifications surprenantes à condition toutefois d'être appliqué selon certaines régles à des arriérés dystrophiques.

SOME REMARKS ON BACKWARD CHILDREN.

By DR. RAOUL DUPUY,

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What is meant by Backwardness—Atrophic and Dystrophic Backwardness—Etiology—Somatic and Sensorial and Psychic Anomalies of Dystrophics—Differential Diagnosis—Treatment of Dystrophic Backwardness.

The number of abnormal children, deformed beings, future criminals, lunatics, prostitutes, etc., increases day by day, compromising the future of the country, society, and the race. These subjects, unconscious victims of an unjust fate, what are we to think of them? Are they a tribute which we must pay to our civilisation? Are they an index of approaching decadence? In any case, the community rather than attempt to educate them without any good result (in special schools for backward children), must search for the causes which produce this condition. It must, moreover, place these subjects under treatment, of whom some (namely, dystrophic backward children) suffer from a bodily ailment and can be improved, and sometimes even brought back to the normal.

The study of the anomalies which make up infantile backwardness is most complex, because it includes the whole of pathology. In fact, we must not only (like the neurologists and schoolmasters) speak of backward

children as those who simply present an intellectual deficiency, but we must equally consider in that category those who either at the same or at different times show a retardation, an arrest or a regression as well in corporal and sensorial evolution as in psychical. Beyond this, if we consider that these subjects are in process of growth, that is to say, in a state of biological instability, if we notice also that the types of anomalies are so varied—to such a degree that each backward child taken in his entirety constitutes a special clinical type, and that it is almost impossible to place him in a general classification—we might then appreciate the difficulties that are experienced in giving an idea of unity to this enquiry. In order to judge of a backward child, we must take account of his age, and proceed by comparison. *Every child is backward who, for a given age, shows a retardation in body, mind, or spirit compared with other children of the same age.*

The new-born child has a vegetative life; the infant has an animal life, which becomes human the moment it is endowed with thought and speech. Puberty appears afterwards; the subject is then capable of reproducing itself. What a number of stages a child must pass through before arriving at the age of marriage! Now, to each of these stages there corresponds a whole series of evolutionary troubles which affect the subject either wholly or partially. Backwardness is the most important of these, but there exists also a condition characterised by *exaggeration* or *inversion* which we call *perversion* and *deviation*. The backward children, properly so-called, only therefore represent a certain number of abnormal children, the rest being subjects of perversion and deviation. Like backwardness, perversion may be corporal, psychic, or sensorial. It may be in all three spheres, but this is rare. It may be only in one, and may only concern one system, one organ, one faculty, or one sense. This is the case with giants, prodigies of music or memory, juvenile dements, sexual inverts, etc., but very frequently backwardness is accompanied by perversion, or is caused by it; so much so that infantile backwardness, as we conceive it to-day, is a mixed condition. It is not simply an arrest, a retardation, a regression, an immaturity, but a lack of balance, a disharmony of evolution.

The causes of infantile backwardness are many. The condition may be congenital or acquired, sometimes it is mixed. It is *congenital* in consequence of a weakening of the parental germ (senility, multiple gestations, alcoholism, syphilis, tubercolosis, physiological, poverty, paludism, arthritism, neuropathic condition, etc.). It is *acquired* in consequence of embryonic maladies, abdominal traumatism, or overstrain of the mother during pregnancy, premature birth, dystocia, whether maternal or fœtal, infections of infancy, too rapid growth, or deficiency in nourishment. On this fact, however, we specially insist, that infantile backwardness, whether

congenital or acquired, is called forth by disorders or lesions, which concern either the nervous system and the spinal cord, or one or more internal glands (the thyroid and the parathyroid glands, the hypophysis, the suprarenals and the genital glands—the interstitial portion of the testicle and the corpus luteum of the ovary). First of all we must differentiate between disorders and lesions. The disorders are but disturbances of the physiological order which may be modified. The lesions, which correspond habitually to some form of sclerosis, are incurable. If the lesions have touched the brain or the spinal cord, the types which result from it are those of *atrophic backwardness*, which are incurable in the present state of science, with the exception of certain forms of syphilis. These are the paralytics, hemiplegics, certain epileptics, deaf mutes and blind persons (central blindness), certain forms of hydrophaly and microcephaly, etc. In all the other cases of backwardness, in which are affected the glands of internal secretion, or in which there is cerebral and medullary mischief, due to intoxication or lack of vasomoter stimulus, or troubles of internal secretion owing to defect or excess of the action of these glands—we are in presence of *dystrophic backwardness*, which ought to be more or less curable. In fact, these intoxications are modified by suitable treatment, and the secretory disorders can be remedied by organotherapy.

Taking the two groups of backward children, the atrophic and dystrophic groups, we must add those of mixed origin, which are half cerebral and half secretory; these are to some extent amenable to treatment, and are certainly more numerous than is commonly believed. We will not stop to study the pure atrophics, who, if they present a scientific interest at all, can hardly be improved in the least by medical methods, properly so-called. The dystrophic or mixed varieties, which are capable of cure, deserve to attract the attention of every practitioner. Therefore, in spite of the complexity of their symptoms, we will attempt to point out shortly their different defects, bodily, psychical, or sensorial, which we shall consider separately for convenience of description, only stating in advance, that these anomalies are generally associated in proportions which vary for each subject.

Bodily anomalies may affect either the whole organism or one or several of its systems, perhaps even a single organ, producing ultimately a state of complete or incomplete infantilism. (Herthoge.)

These anomalies are either anatomical or physiological.

For the bony system, the habitual seat of dystrophies, they have ill effects on the vitality (osteo-porosis) the form, dimensions, the processes of joining together and of calcification (rachitism). The stoppage and the arrestation shew themselves in the smallness of the bones in general. The anomaly is either complete (nanism) or partial (ectromelism and micromelism of the

humerus for example). And as, in all states of arrested development, we meet, as we have said previously, with perversion and deviation, we often find in these subjects, who are otherwise backward, total or partial gigantism (especially in the extremities), disproportions, and even types of malformation identical with those of acromegaly.

The common character possessed by all the long bones of those whose development is arrested—where there is perversion or arrestation—is that of an arrested ossification which can be verified by the radiograph. On the contrary, flat bones—those of the cranium for example—sometimes join up too rapidly without one being able to find lesions of the meninges which might have pushed on this work of premature ossification.

The muscles behave like the bones. One sees them in a state of atrophy (Thenar eminence, gluteal region, muscles of the back, muscles of the limbs), in a state of hypertrophy, or of myxoedema, like those of the tongue. Considered from the point of view of their tonicity, they are hypo or hyper-tonic, and if we add to this state the loosening or the contraction of the ligaments and of the aponeuroses, we can easily understand why the postures of standing and walking are sometimes difficult for these subjects.

Some are truly "enfants en caoutchouc" (with frequent umbilical and inguinal hernias) who can place themselves in the fœtal position by folding themselves up; others are stiff "automata" where the rigidity is marked.

Thus the pathogenesis of certain malformations is explained: flat foot, club foot, genu valgum, in which, as in most of the osseous dystrophies, diaphysial or epiphysial, there is disharmony between the ligaments and the opposing muscles, the one set being relaxed and the others contracted. As regards articulations, we may note congenital dislocations following on incompleteness of the articular cavities and relaxation of ligaments. Articular rigidity following on ligamentous and muscular retraction often gives the impression of ankylosis. We have noted this phenomenon at the level of the radiocarpal articulation; this trouble completely prevents movements of pronation and supination.

It is by this process of hypo and hypertonicity that the deviations of the spinal column (scoliosis, lordosis), which are relatively frequent, are produced. In the same connection we may point out unnatural positions of the head on the trunk, which appear to have the same origin. Often it suffices to see these children walk or run, the head pushed forward, the arms held back, going up, and especially coming down, a flight of stairs, in order to make a diagnosis of errors of development; so marked is their gait. Their circulation is always defective. The heart, besides malformations (such as mitral stenosis), lacks tonicity: low arterial tension is a sign of this. The beat is irregular (tachycardia, embryocardia, intermittences).

The arteries are small, hard, and inelastic. This state favours a lowering of pressure and explains the slight difference—sometimes none at all—

(which can be found by Pachon's oscillometer) between the maximum and minimum pressure in an artery. There is "anangeoplasy," as Brissaud said. Their pressure varies between 5° and 10° according to their age and condition.

The veins are either indurated or hypotonic. This fact explains the thromboses, varicose veins, and the bad venous circulation. The capillaries become obstructed: nutrition, tissue-respiration, and temperature are fatally affected owing to this condition (chilblains, trophic mischief, low temperature, congestion of the extremities, a habitual sense of cold, etc.).

The blood has an abnormal composition. It is poor in lime salts (hæmophilia). It shows lowering of the red cells (anæmia and systolic murmurs) and an increase in the white cells. The hæmoglobin index is lowered. The hyperleucocytosis deserves attention. Can it be the explanation of the habitual immunity of these subjects against the infectious maladies of infancy? This lymphatism is accompanied by a hypertrophy of the lymphoid tissues (adenoid vegetations) which causes the disorders with which we are acquainted.

The anomalies of the *nervous system* are many in number. They consist, in the first place, of malformations of the skull, which give birth to a quantity of types—plagiocephaly and other various cephalies which have been well described. In the brain we find an increase or diminution of the total cerebral substance. The most frequent dystrophies are agenesis of certain lobules, thinness of the cortical substance, and shallowness of the fissures. On microscopic examination, one is often struck with the rarefaction of the nervous cells, and of the blood vessels. Many of the children who have presented symptoms of hysteria or epilepsy, and who have had convulsions, show no trace of cerebro-spinal lesions. The glands of internal secretion are either absent, sclerosed, or rudimentary, or in a condition of adenomatous hypertrophy. Hypertrophy of the hypophysis if often accompanied by enlargement of the "sella turcica." Sometimes these glands appear to be normal, but they have not been studied from the chemical point of view. We note also the persistence of the thymus.

If one passes in review the different systems of the body, one finds that they all present either backwardness or perversion, both in their constitution and function

Digestive appartus; Mouth; retarded and incomplete dentition; persistence of the milk teeth; dental caries; defective insertion of teeth, on account of the faulty position of the palatine vault (arched or flattened; narrowed maxilla), macro and micro-dentism, Hutchinson's teeth; thick or narrow lips, hare-lip; tongue enlarged, elongated, webbed, faulty insertion of the frenum.

Salivary glands, increased or diminished secretion. Stomach and Intestines; gastric dilatation, rumination, obstruction, constipation, enteritis, hepatic insufficiency, with jaundiced tint.

Assimilation. Assimilation is always defective. This will be shown in the end by examination of the urine. Often these children show a retarded nutrition, characterised by fatness, myxoedema, rheumatism, etc.

Respiratory apparatus; Larynx, eunuch-like or cavernous voice; Lungs and bronchi, emphysema and chronic bronchitis. Urinary apparatus; kidneys with many lobes, atony of the sphincters, ectopia, and hypospadias.

The examination of the urine is most interesting. It reveals the presence of indican in abundance, of albumen in small quantities, of urotilin, of biliary pigments and scatol. These people are then subjects of intoxication. Besides that, there is to be noted the retention or hypersecretion of substances normally contained in the urine (water, chlories, phosphates, lime salts, uric acid, urea). These facts indicate that there is either a slowing down of nutrition or excessive loss of mineral substances. The retention of the chlories in particular, corresponds to a state of asthenia, which we shall study later. The hyperexcretion of chlorides on the contrary, corresponds to a state of instability, and is met with sometimes in certain forms of epilepsy. The genital apparatus is, so to speak, always in a state of dystrophy. We note the atrophy or hypertrophy of the organs. Cryptorchidy on one or both sides is frequent. We may also mention atrophy or hypertrophy of the mammary gland. These bodily troubles are accompanied with lateness or earliness of puberty. In the latter case, the patients often show also bodily, psychical, and sensory stigmata of sexual inversion.

The anomalies of the *cutaneous system* are characterised either by thickness, dryness, and wrinkling of the integument, or by a transparency and unusual thinness of the skin. We find either congestion or anæmia. Reflexes are either absent or exaggerated. The skin is often the seat of special affections. The hair presents interesting peculiarities; its quantity may be either increased or diminished; its constitution and appearance may be of all kinds: thick, fine, friable, dull, short, etc.

Sleep is either too deep (with nocturnal incontinence); long or light, disturbed or short (somnambulism).

The *reflexes* in general are either absent or exaggerated; sometimes normal.

The *facial aspect* shows numerous anomalies of the various parts which compose it. We shall enumerate these dystrophies later on when we study the sense organs.

Considered as a whole the face may be puffy, moon-shaped, with flabby cheeks and protruding lips, and consequently a complete lack of expression. Sometimes, on the contrary, it is thin and mobile. The variation of expression is extraordinary. Asymmetry is common, and we sometimes meet with peripheral palsies.

To sum up, considered from the bodily point of view, the backward children cannot be strictly classified, as we have said before, and yet there

is a certain correspondence of clinical type, somewhat artificial it is true, and yet which we can label with terms such as myxoedamatous, mongolians, sexual inverts, fatty dystrophies, and other terms which would indefinitely prolong this list.

A special bodily dystrophy, which often accompanies backwardness, is characterised by a juvenile senility, which deserves a special place in our account. It shows once again that the state of backwardness is a mixed phenomenon, and that it includes both retardation and perversion of the natural evolution.

The *psychical anomalies* have specially attracted the attention of teachers and neurologists. They are such as parents themselves notice, and for which they come for advice.

This explains to us why the term "backward" is applied—wrongly—by a number of authors, specially to indicate patients who show intellectual deficiency.

Psychical defects, like bodily defects, consist in retardation, arrest and regression, but also in perversions of faculties. With these patients, judgment, reflection, the moral sense, co-ordination of ideas, the faculty of comprehension, are either absent or defective. On the other hand, we often see in them a more or less marked ability for such and such a branch of intellectual ability.

Anomalies of *will* enable us to divide up these patients to a certain degree. We meet, in fact, the will-less, the asthenic, the apathetic types, which make the first category, and the unstable and the fussy people who cannot fix their attention, who enter into the second group.

Anomalies of *instinct* also frequently occur. They may be met with in many different combinations which indicate a state of backwardness. We find, for instance, cowardice and suicide, loss of appetite or gluttony, theft or prodigality, egotism or exaggerated sentimentality, and various perversions of the sexual instinct such as onanism, sadism, inversion, or exhibitionism. The perversions of instinct produce numerous troubles which can be so accentuated as to come under the name of dementia. It is impossible to establish a line of division between backwardness, perversion, and insanity.

In any case the backward children present numerous defects which prevent their mixture with society: brutality towards animals, anger, envy, jealousy, cowardice, laziness, lying, cruelty.

The anomalies of *speech* are characterised by mutism in deaf people, and by defects of speech—such as pidgin-language—in the patients who are lacking in ideation.

Stammering shows a lack of co-ordination in the function of the speech organs. Defects of pronunciation are very numerous. They may be grouped under the head of lisping, which consists in the substitution, the suppression, or the faulty production of a letter in the

word. The principle types of lisping have to do with the letters J., Ch., H., and B. For instance, "Jap" for "lap," "shaushe" for "sauce," "mahine" for "marine," etc.

Several backward people speak with a nasal twang deforming their vocal or nasal sounds. These last defects of pronunciation are the result of laziness or contraction of the buccal cavity, or from the increased size or motor defects of the tongue.

Defects in writing are habitual and correspond with perversions of the will. The handwriting of the apathetic patients is thick, round, often regular, but without character, while that of the unstable is irregular, shaky, and jerky.

Reading is often difficult. Certain children spell words without understanding them. In writing and in reading we meet a whole series of disorders which are comprised under the term aphasia, agraphia, word-deafness, word-blindness, etc.

The memory of these patients is often extraordinary, to such a degree that certain backward persons can remember places or persons which they have only see once ten or fifteen years ago, and their memory for dates is surprising.

Some of these subjects show great talent for arithmetic, music, and imitation in speech or gesture. Their sensibility is often very high, tears come readily, cries and complaints are frequent and without reason; for they have been the object of care and attention which is not spent on ordinary children.

Backward children have almost all habit spasms or manias or phobias of various kinds; choreic movements and nervous contractions, more or less localised to certain groups of muscles.

To sum up, looked at from a mental point of view, the backward child may be an absolute idiot; in this case, whatever his age, his intellectual faculties correspond to those of a child not more than three to five months old.

The profound idiot corresponds to a normal subject of two years old.

The imbecile has an intelligence equal to a child of two to eight years old.

Diagnosis therefore of idiocy and imbecility cannot be made at birth.

The feeble-minded is a backward person who will always be four to six years behind his true age.

The backward children, so denominated in relation to their teachers, are often feeble-minded children who present a perversion of will and attention which gives rise to the apathy and instability of which we have already spoken.

The *sensorial* anomalies concern the organs of sense, or the manner in which the patients interpret their sensations. In either case we find, as always, backwardness and perversion.

In the case of *sight* the anomalies are concerned with the surroundings of the eye: the eyelids, whose palpebral slit is placed slantways, as in Mongolism, or which shows an accessory membrane (epicanthus), the Lacrymal glands which act defectively (several backward children weep without tears), the motor muscles which lack co-ordination, or which show intermittent contractions.

The eye is frequently in a state of exophthalmos. The anomalies which it shows may concern all its constituent parts, especially if there is an arrest in the development, as for example in coloboma.

In the *retina*, we note papillary dystrophy owing to vascular defect, which even causes blindness, which may persist after a few months from birth. The iris is abnormal by lack of pigmentation, and inco-ordination of the muscles which put it into action. This produces paradoxical reactions of the pupils. These are inactive, dilated, or contracted, and deprived of the reflexes, except such as may be caused by a cerebral lesion. In the case of many backward children, the eye is dull, the look vague, without expression and without life. Sometimes, on the other hand, the eyes are too brilliant, the look is too lively, too piercing and too fixed. Faults of refraction and colour-blindness are also frequent. Perversions of interpretation are very common, a greater part of these children are unable to recognise colours, and estimate distances and dimensions.

The *hearing* is abnormal, in so far as the hearing apparatus is incomplete (absence of an ossicle, malformation of the tympanum, atrophy of the organ of Corti), the acuity of hearing is there diminished. Deafness, however, is often due to another cause, namely the presence of adenoid vegetations in the pharynx, which block up the opening of the Eustachian tube. On the contrary, numbers of backward children show an over-acuteness of hearing, and have a decided taste for music. We will not speak of the malformations of the *external ear* which are well-known, such as exaggerated dimensions, unusual setting, dystrophies of lobes, the tubercle of Darwin.

Taste shows several anomalies. Atrophy of the papillae explains why certain subjects are unable to distinguish certain flavours, and perversions are frequent.

Smell has also its anomalies. Without speaking of the external dystrophies of the nose,—which, with the open mouth resulting from defective respiration through the nose, complete the unpleasant picture of the backward child,—it is necessary to mention the various anomalies, such as malformations or hypertrophies of the septum, absence of one nostril, etc. In the case of some, the sense of smell is very slight. In others, on the contrary, it is highly developed, and in many cases, one finds also signs of perversion in the interpretation of sensation.

The anomalies of *touch* bring us to the study of the hand. The hands of backward persons present varied types. Hands long and tapering, hands short and thick, hands wrinkled and dark-coloured, and other varieties.

Hands of male sexual inverts are often identical with those of women, the first finger being longer than the ring finger. As to the other senses, we find both backwardness and perversion; absence of sensibility (frequent burns), inability to recognise the shapes of certain things (absence of idea of "relief") or the consistency of certain stuffs, and difficulty in distinguishing heat and cold at a given point, difficulty in grasping, etc. We must, however, remark that one sensorial deficiency is often compensated by an extraordinary development of another sense. Backward people frequently have sensory hallucinations.

To sum up, it is very difficult to establish a classification of backward children based on their sensory anomalies, for sensory anomalies are often found in otherwise normal children. Sensory anomalies, moreover, when anything short of complete (blind and deaf mutes) are only part and parcel of backwardness of body and mind.

The *diagnosis* of infantile backwardness does not give us very great difficulty; to estimate it quantitatively is a more delicate matter, but more difficult still is it to diagnose the cause. Is the backwardness of cerebral origin due to internal secretion? If it is of cerebral origin, is it due to a lesion, to physiological disorder or to intoxication? To decide these things, we must have accurate information as to the history of the child. Was it a full-time child, was it normal at birth, had it any symptoms of meningitis, when did it start its dentition, when did it begin to speak or walk? In the case of an older child, when did puberty appear? What was the incident which first suggested arrested development? This information is often lacking, and the doctor is then reduced to suppositions. Parents, whose love is blind, have never taken careful note of the state of their child, so cannot remember it. Often there is nothing to be got out of them. We may learn something from the state of the pulse, the arterial pressure, the examination of the urine, the radiography of the bones, etc., but we shall not get any certainty from these.

The treatment of *combined organotherapy* which is a very touchstone of diagnosis, gives us valuable information by the results which it brings about. It fails in cases of pure cerebral lesion, that is in cases of atrophic backwardness, and it brings about notable changes in the mixed or dystrophic forms.

The treatment of dystrophic backwardness rests upon the finding of clinical examination. These are intoxicated subjects who either eliminate their mineral substances or retain others, who suffer from anaemia, excess of leucocytes, and a habitual low arterial tension. These peculiarities are regular, whatever be the prominent feature of backwardness. Conditions which are apparently different bring us back therefore to the same causes. We shall not speak of prophylactic treatment which is suggested by the

causes of backwardness, which we have already indicated, but we shall insist, in passing, on the importance of the spread of knowledge of the right way to bring up children in their early years.

Effective treatment must be preceded by the removal of the adenoid vegetations, which damage the respiration and blood-formation, and which bring on hyperleucocytosis. We must also examine the eyes, and give the child spectacles, if he shows the least error of refraction,—which, if not corrected, causes backwardness. Nourishment must be sound and sufficient; constipation must be treated; long hours of bed and sleep are required. We must replace the lost minerals by glycerophosphates of lime, soda, potash, magnesium, iron, which will be fixed and transformed in the organism by means of the internal secretions.

There are two special methods of organotherapeutic action. First a general action given by the thyroid gland; second, a special action given by each of the other glands in particular. The general action of the thyroid gland is undeniable. For this gland, which is the very sun of the organism, has a stimulative action on the whole economy, bringing into activity the secretion of all the glands, both external and internal. But if there is a total, or nearly total, lack of function of another gland than the thyroid, such as the hypophysis, supravenals, or the genital glands,—and this is habitually the case with backward children— then treatment with thyroid can no longer excite the secretion of an organ which is absent or destroyed. To get any result, we are obliged to resort to other glandular extracts taken from animals, and the administration of these necessitates a special technique. Glandular extracts must be given in small doses from a quarter to half a mg. daily, in all cases except for the genital extract (1 mg.). They must be given together, or alternating frequently. The best method of administration is intra-muscular by means of glycerinated extract prepared in the cold. They are not to be taken by the mouth except when impossible to do otherwise. The treatment must last several months, and may have to be continued even for years. It ought to be given for periods of 20 to 30 days, and then left off for a fortnight or three weeks. With treatment such as we have suggested, there is no fear of accident.

The heart must be examined frequently. As to injections, if they are made deeply, and if the extract has been prepared in a sound laboratory, they are practically painless, and I have never seen an abscess result. The organotherapy can be completed by injections of liver and spleen extract in the graver forms of malnutrition, or by injection of medullary substances. Cold beef marrow with meals, cod-liver oil, salt baths, rubbing with alcohol are all useful. General massage and gymnastics should also be prescribed for their stimulating and sedative action; these are a great assistance to treatment, and should never be neglected. We should say, by

the way, that whatever be the degree of restlessness or instability, we deprecate the use of bromides in any form, for, if they calm the patient at the time, they reduce the cerebral faculties for a longer period.

How are we to explain the action of combined organotherapy? Its action is purely by substitution. It may supply one force, or antagonise others. The disorders which we have enumerated before are functional anomalies of the sympathetic, that great regulator of the organism, on which the glands of internal secretion have a stimulative action. Similarly that extracts of all glands must operate through the same agency. The hypophysis and the suprarenal increase arterial tension, while the genital glands and the thyroid decrease tension, that is to say, antagonise the others. Besides this, these internal glands have an undeniable effect upon the assimilation.? Ever on the watch, they regulate, the one (hypophysis) metabolism of the carbo-hydrates, and the other (thyroid) metabolism of nitrogenous products; others regulate the mineral salts, chlorides and phosphates of lime. Moreover, they must have the same effect at the moment of sex determination and give completeness to the characters thus formed. Each gland, in fact, must have its part in the dystrophies of the systems; and we must ask ourselves, if each of the glands, or more exactly each of the two parts, which constitute each gland, has not some action on the evolution of the primitive layers of blastroderm; and whether the ectoderm, mesoderm and endoderm are not specially activated or at least influenced by one or other internal gland whose secretions appear to give it its vital energy.

The result of combined organotherapy are most encouraging, and sometimes even have surprised our hopes, so obvious have the benefits been. The great factors in success are the early years of the subject, the patience of the doctor, and the persistence of the parent. In 150 cases, which we have studied, and followed, where the treatment was applied by ourselves or by other doctors who had asked our advice, we have never had one failure. There has always been improvements more or less noticeable, except in cases where the patients were too old (for the time being, we are thinking only of the *mental* condition, for organotherapy is capable of producing changes in the *bodily* condition even at an advanced age, after puberty). Twice over, Dr. Perrier has communicated our results to the Academy of Science (January and April, 1912). After the administration of combined glandular extracts, there is noticed, (1) Increase of height without emaciation, (2) decided increase in arterial tension, and in animal heat; diminution of cardiac beats, (3) rapid changes in the content of the urine, which shows that the subject is getting rid of his poisons, and that his metabolism is tending to become normal, (4) diminution and cure of the sympathetic or reflex anomalies, such as slight disorders, visceral ptosis and nocturnal incontinance, (5) physical transformation of the patient, which produces an effect on each separate system, and above all, on the genital

system, causing the appearance of puberty, (6) intellectual transformation by reason of the development of thought; reasoning and co-ordination of ideas ; the weakness and excitement of the brain are improved. There is an increase in intellectual attention and activity. These children often make rapid progress at school, and are consequently able to maintain some sort of position in society, to follow some trade, and often become excellent workpeople, so long as they are kept to their own special line.

It is certain that backward children who present intellectual anomalies ought to receive special training, and that in private schools with the boarding system. In these schools the doctor ought to have the main and preponderating influence, for all these backward subjects in intellect have generally a bodily ailment, which one must attend to first, and educate them afterwards. We will not speak of the special training applied to backward children. This subject has already been dealt with at length by others with more knowledge than ourselves, but we cannot conclude our remarks without insisting that in order to perform useful work, the schoolmaster must be the assistant and friend of the doctor.

Conclusions :—

(1) Backward children present either separately or in combination an arrest or retardation in their bodily and intellectual evolution, and in their sensory aptitudes.

(2) These anomalies are due to two causes, cerebral lesions, which are generally incurable (atrophic backwardness), or else damage or abnormal function of the glands of internal secretion, with corresponding effects on the sympathetic system (distrophic backwardness), which is curable.

(3) The dystrophis forms of anomaly are very varied. They may be bodily, psychial, or sensory, besides backwardness there may be perversion also.

(4) The diagnosis of the type of backwardness is very delicate, and is often not made except by the use of organotherapy, which acts like a specific in the second category of cases.

(5) Combined organotherapy produces surprising results, but always on condition that it is applied to dystrophic backwardness according to certain rules.

Appendix.

SECTION II.

CONSIDÉRATIONS GÉNÉRALES SUR "LA PUÉRICULTURE AVANT LA PROCRÉATION."

(Résumé.)

Par ADOLPHE PINARD,

Professeur à la Faculté, Membre de l'Académie de Médecine de Paris.

Owing to the serious illness of Professor PINARD the Abstract only is available for publication.

Sir François Galton a dénommé Eugénique, la science nouvelle ayant pour objet " l'étude des causes soumises au Contrôle social, pouvant améliorer ou affaiblir les qualités de race des générations futures, soit physiquement, soit mentalement."

L'Eugénique, ainsi définie, n'est autre chose que " la Puériculture avant la procréation " étudiée en France depuis un certain nombre d'années, et qui constitue la première partie de la *Puériculture*, " *science ayant pour but la recherche des connaissances relatives à la Reproduction, à la Conservation et à l'Amélioration de l'Espèce Humaine.*"(1)

Le Congrès doit donc avoir pour but de travailler à la recherche des conditions nécessaires pour obtenir une bonne procréation. Or, il apparaît que le mot *Eugénique*, au point de vue étymologique, ne caractérise ni explicitement, ni suffisamment le but visé, tandis que le mot *Eugennique*, du verbe γεννᾶω rappelle immédiatement à l'esprit l'idée d'une bonne procréation(2).

Il appartient à notre première grande assise de statuer d'abord sur ce point.

Certes, les recherches biologiques, les recherches sociologiques et historiques, les lois et coutumes sociales envisagées dans leurs rapports avec la science Eugénnique, sont, nécessaires et aboutiront, sans aucun doute, à des données extrêmement intéressantes, mais, dès maintenant, il est urgent avant tout, d'établir et de proclamer les principes Eugenniques.

Les recherches relatives à l'hérédité physiologique et à l'hérédité

(1) v. De la Puériculture, in Revue Scientifique, 1897.

(2) De plus, le mot Eugénique rappelle, en France, un terme de chimie : acide eugénique.

pathologique doivent être incessamment poursuivies, mais il importe de faire connaitre, le plus tôt possible, aux masses popularies, les conditions individuelles, actuellement bien connues, qui, seules, permettent une bonne et saine procréation. En un mot, il faut, par tous les moyens et aussitôt que possible, déterminer un grand mouvement dans le but de montrer au plus grand nombre des êtres humains, la nécessité absolue d'une *Procréation consciente*, c'est-a-dire *éclairée*. Il faut aborder hardiment la civilisation de l'*Instinct de Reproduction*, seul resté à l'état barbare dans toutes les nations dites civilisées, depuis les temps primitifs.

Alors seulement, lorsque les sociétés auront rempli ce devoir, elles auront le droit de rechercher ce qu'elles doivent et peuvent faire contre ceux dont la future progéniture serait reconnue comme devant être fatalement désastreuse pour elles.

Enfin, il est bien entendu que doivent se poursuivre, parallèlement, les recherches relatives à la sélection dans l'espéce humaine, comme cela se fait, actuellement et si fructueusement, pour les animaux et les végétaux en *Génétique*, et en s'éclairant des conquêtes sans cesse croissants, de cette autre science.

GENERAL CONSIDERATIONS UPON "EDUCATION BEFORE PROCREATION."

(Abstract.)

By ADOLPHE PINARD,

Professor at the Faculty; Member of the Academy of Medicine of Paris.

Sir Francis Galton has entitled Eugenics the new science having for its object the study of the causes subject to social control which can improve or impair the racial qualities of future generations, whether physical or mental.

Eugenics, thus defined, is nothing else but "Education before Procreation," which has been studied in France for a number of years, and which constitutes the first part of child-culture, "a science having for its object the search for information relative to the reproduction, preservation, and improvement of the human species "(1).

The Congress ought then to have for its object to work for the investigation of the conditions necessary to secure a favourable procreation. Now, it appears that the word "Eugenics," from the etymological point of view,

(1) v. De la Puériculture in Revue Scientifique, 1897.

does not characterise either explicitly or sufficiently the proposed object, while the word "Eugennique," of γεννάω, at once recalls to the mind the idea of a favourable procreation(2).

It is part of the duty of our first principal sitting to lay down a rule upon this point.

Certainly, biological, sociological, and historical researches, laws and social customs regarded in their relations with the science of Eugenics, are necessary and will undoubtedly result in extremely interesting data, but from now it is above all things urgent to establish and proclaim eugenic principles.

Researches relating to physiological heredity and pathological heredity ought to be pursued without interruption, but it is necessary to make known as soon as possible to the masses of the people the individual conditions, fully understood, which alone permit a favourable and healthy procreation. In a word, it is necessary, by every means and as soon as possible, to organise a great movement in order to show to the greatest number of human beings the absolute necessity for a conscientious, *i.e.*, an enlightened procreation. We must bravely approach the civilising of *the reproductive instinct*, which alone has remained in a barbarous state amongst all the so-called civilised nations from the earliest times.

Then only, when societies have fulfilled this duty, will they have the right to investigate what they ought and can effect against those for whom future offspring would be recognised as fatally disastrous.

Finally, it is fully understood that researches relating to selection in the human species must be pursued in a parallel manner, as is now done with such fruitful results for animals and vegetables in Genetics, and in throwing light upon the constantly increasing conquests of this other science.

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(2) Besides, the word "Eugenics" recalls in France a chemical term : eugenic-acid.

PRELIMINARY REPORT OF THE COMMITTEE OF THE EUGENIC SECTION OF THE AMERICAN BREEDERS' ASSOCIATION TO STUDY AND TO REPORT ON THE BEST PRACTICAL MEANS FOR CUTTING OFF THE DEFECTIVE GERM-PLASM IN THE HUMAN POPULATION.

By BLEECKER VAN WAGENEN, *Chairman of Committee.*

1.—*History of the American Breeders Association, Eugenics Section, and Committee on Defective Germ-plasm.*

The American Breeders Association was organized in 1903 for the purpose of bringing together practical breeders, experimenters, investigators, and teachers interested in the subject of breeding, for the advancement of the science of genetics. Its headquarters are in Washington, D. C., and its President is the Hon. James Wilson, Secretary of the Department of Agriculture, and member of the President's Cabinet. The association has three sections: plants, animals, and Eugenics. The Eugenics Section has now ten research committees, each comprised of eminent specialists, as follows:—

Committee on Heredity of Feeble-mindedness.
Committee on Heredity of Insanity.
Committee on Heredity of Epilepsy.
Committee on Heredity of Criminality.
Committee on Heredity of Deafmutism.
Committee on Heredity of Eye Defects.
Committee on Immigration.
Committee on Sterilization and other means of Eliminating Defective Germ-plasm.
Committee on Genealogy.
Committee on Inheritance of Mental Traits.

The Eugenics Record Office, located at Cold Spring Harbor, New York, under the direction of Dr. C. B. Davenport, of the Carnegie Station for Experimental Evolution, is closely affiliated with the Eugenics Section.

The purposes of this office, of which Prof. H. H. Laughlin is Superintendent, are:

1. To serve as a clearing house for data on human heredity.
2. To build up an index of the American population, recording families, traits, and their geographical distribution, with special reference to super-normal and sub-normal traits.
3. To train field workers expert in gathering data of Eugenic import.
4. To maintain a field force actively engaged in collecting such data.

5. To co-operate with other institutions and with persons concerned with Eugenic research.
6. To study authentic data, seeking thereby to discover the manner of inheritance of specific traits.
7. To promote and to aid in the organization of new centres of Eugenic research.
8. To advise concerning the Eugenic fitness of contemplated marriages.
9. To disseminate Eugenic truths.

The committee on sterilization and other means for eliminating defective strains from the human population was appointed at the annual meeting of the Eugenics Section of the American Breeders Association held in Palmer, Massachusetts, in May, 1911. Its members are:

Bleecker Van Wagenen, Chairman, New York City.
W. H. Carmalt, M.D., Newhaven, Conn.
Everett Flood, M.D., Palmer, Mass.
H. W. Mitchell, M.D., Warren, Pa.
H. H. Laughlin, Secretary, Cold Spring Harbour, N. Y.

This committee has organized an advisory and consulting committee as an adjunct consisting of the following specialists:—

Medicine, Dr. L. F. Barker, Johns Hopkins University.
Surgery, Dr. Alexis Carrel, Rockefeller Institute, New York City.
Physiology, Prof. W. B. Cannon, Harvard University.
Biology, Prof. H. J. Webber, Cornell Univerity.
Psychology, Dr. H. H. Goddard, Vineland Training School, New Jersey.
Psychiatry, Dr. Stewart Paton, Princeton University.
Thremmatology, Prof. Raymond Pearl, Maine Agricultural College.
Anthropology, Prof. A. F. Chamberlain, Clark University.
Criminology, Judge W. W. Foster, Court of General Sessions, New York.
Sociology, Prof. F. H. Giddings, Columbia University.
Political Economy, Prof. James A. Field, University of Chicago.
Law, Hon. James M. Beck and Mr. Louis Marshall, of the New York Bar Association.
History, Dr. James J. Walsh, Dean of Fordham Medical College, New York.
Statistics, O. P. Austin, Esq., Chief of the Bureau of Statistics, Washington, D.C.
Public Affairs, Prof. Irving Fisher, Yale University.
Woman's Viewpoint, Mrs. Caroline B. Alexander, Hoboken, New Jersey.
Immigration, Prof. R. De C. Ward, Harvard University.

The committee is seeking and receiving assistance from many sources, both public and private, in contributions of data pertinent to its investigations, and it seeks the co-operation of anyone having such to impart.

2.—Nature of the Problem and Reasons for the Investigation.

In recent years society has become aroused to the fact that the number of individuals within its defective classes has rapidly increased both absolutely and in proportion to the entire population; that eleemosynary expenditure is growing yearly; that some normal strains are becoming contaminated with anti-social and defective traits; and that the shame, the moral retardation, and the economic burden of the presence of such individuals are more keenly felt than ever before. Within the last three years especially there has been a marked development of public interest in this matter. The word "Eugenics" has for the first time become known to thousands of intelligent people who now seek to understand its full significance and application.

Whether wholly of defective inheritance, or mostly of good inheritance, but suffering from an insurmountable hereditary handicap, members of the following classes must be considered as socially unfit, and their supply should, if possible, be eliminated from the human stock: (1) the feeble-minded; (2) the pauper class; (3) the criminal class; (4) the epileptics; (5) the insane; (6) the constitutionally weak, or the asthenic class; (7) those predisposed to specific diseases, or the diathetic class; (8) the deformed; (9) those having defective sense organs, as the blind and the deaf, or the kakaisthetic class.

With the statistics at present available, it is impossible to give an accurate table of the numbers within each of these classes. The following table giving the enumeration of defective and helpless individuals within institutions has been compiled by our committee from the various special reports of the United States Census for the eleventh (1890), twelfth (1900-1904) and thirteenth (1910-1912) censuses.

It is hoped that future censuses will make a more careful classification of defectives, and a more accurate and complete enumeration of such individuals both within and not within institutions.

From the following table it is seen that there are in the United States nearly two-thirds of a million persons so defective that the State must exercise a constant custodial care over them.

It is impossible to measure the industrial and social handicap caused by these individuals. But just as the leaders of successful human endeavour exert an influence altogether incommensurate with their number, so this class, doubtless, constitutes a drag on society of similar magnitude.

Along with penal, hospital, and eleemosynary care, a remedy looking toward the cutting off of the supply of defectives is being sought on every

INMATES OF INSTITUTIONS IN THE UNITED STATES.

Institutions for	ELEVENTH CENSUS-1890 TOTAL POPULATION-62,222,250			TWELFTH CENSUS-1900 (1) TOTAL POPULATION-75,994,575			THIRTEENTH CENSUS-1910 TOTAL POPULATION-91,972,266			INCREASE (+) DECREASE (-) TOTAL POPULATION + 13,772,325 ELEVENTH CENSUS 1890 vs THE TWELFTH 1900			INCREASE (+) DECREASE (-) TOTAL POPULATION TWELFTH CENSUS 1900 vs THE THIRTEENTH		
	No. of Institutions	No. of Inmates	Inmates per 100,000 Population	No. of Institutions	No. of Inmates	Inmates per 100,000 Population	No. of Institutions	No. of Inmates	Inmates per 100,000 Population	No. of Institutions	No. of Inmates	Inmates per 100,000 Population	No. of Institutions	No. of Inmates	Inmates per 100,000 Population
Blind & Deaf	88	7,652	12.2	115	15,153 (2)	18.		(3)		+27	+7,501	+5.8			
Feeble-Minded (4)	24	5,254 (5)	8.4	42	14,347	18.8		20,199	21.9	+18	+9093	+10.4			
Insane	162	74,028	118.2	328	150,151	186.2	372	187,454	203.8	+166	+76,123	+68			
Criminal (6)	2,602	82,329	131.5	1,337 (7)	81,772	100.6		113,579 (8)	125.	-1265	-557	-30.4			
Juvenile Delinquents	58	14,846	23.7	93	23,034	28.3		22,903	24.9	+35	+8188	+4.6			
Paupers	2,373	73,045	116.6	2,476	81,764	101.4		83,944	91.3	+103	+8,719	-15.2			
Eleemosynary (9)	1,916	111,910	179.8	4092	268,456	354.6				+2176	+156,746	+174.8			
Total	7,223	369,064	590.4	8483	634,877	807.9				+1260	+265,813	+217.5			

(1) The special enumeration of the 12th Census was made in 1904.
(2) 1910 Enumeration found 61,423 Deaf and Dumb, 44,312 Blind, 584 Blind, Deaf and Dumb:- Total — 106,319
(3) The 11th Census enumerated 93,403 in population at large. One Koren estimated the Feeble-Minded in 1890 at 150,000
(4) Included in the 11th but not included in the 12th Census —
(a) Prisoners not under sentence (c) In prison for non-payment of fines
(b) In military & naval prisons (d) Children under 10 years of age
(5) Alex. G. Bell's special enumeration:- Blind 64,763 — Deaf 57,287
(6) Epileptics included for the most part with the Feeble-Minded.
(7) U.S Civil Prisons, State Prisons, State & County Penitentiary, Reformatories for Adults, County Jails & Work-houses, Municipal Prisons & Work-houses, including 530 empty county jails.
(8) Includes cases of imprisonment for non-payment of fine - 600 does not include these.
(9) Orphanages & Childrens Homes, Nurseries, hospitals, dispensaries, permanent and temporary homes.

hand. Among other remedies, the following have been proposed as means for promoting or effecting the desired ends :—

1. Life segregation (or segregation during the reproductive period).
2. Sterilization.
3. Restrictive marriage laws and customs.
4. Eugenic education of the public and of prospective marriage mates.
5. Systems of matings purporting to remove defective traits.
6. General environmental betterment.
7. Polygamy.
8. Euthanasia.
9. Neo-Malthusian doctrine, artificial interference to prevent conception.
10. Laissez-faire.

Which of these remedies shall be applied? Shall one, two, several, or all be made to operate? What are the limitations and possibilities of each remedy? Shall one class of the socially unfit be treated with one remedy and another with a different one? Shall the specifically selected remedy be applied to the class or to the individual? What are the principles and limits of compromise between conservation and elimination in cases of individuals bearing a germ-plasm with a mixture of the determiners for both defective and sterling traits? What are the criteria for the identification of individuals bearing defective germ-plasm? What can be hoped from the application of some definite elimination program? What practical difficulties stand in the way? How can they be overcome? These and other questions arise, hence this investigation.

It is difficult, indeed, to make an accurate estimate of the number of defectives not in institutions. The eleventh (1890) census enumerated 95,609 feeble-minded persons not in institutions, while only 5,254 of this class were found within institutions. The special enumeration of the twelfth census (1904) found 15,153 blind and deaf individuals within institutions, while not in institutions Alexander Graham Bell's special enumeration of 1900 found 64,763 blind persons, and 89,287 deaf persons. In 1910 the enumeration returned 61,423 deaf and dumb, 44,312 blind, and 584 blind, deaf, and dumb, total 106,314.

In 1900 (the twelfth census) 634,877, or .8% of the population of the United States, were under custodial care. It is, doubtless, conservative to estimate that at least 3,000,000, or nearly 4%, were equally defective, but not under the State's care. While upon the borderline, just above this class, were, doubtless, 7,000,000, or nearly 10% of the total population, who, though bearly able to care for themselves, and only just abstaining from acts which would bring them under the care of the State, are of such inferior blood, and are so interwoven in kinship with those still more defective, that they are totally unfitted to become the parents of useful citizens.

3.—*History of Sterilization Legislation in the United States.*

In eight of the States of the Union there are laws authorizing or requiring sterilization of certain classes of defectives and degenerates.

The first law was passed in Indiana in 1907, and the last in the State of New York in 1912. The other States which have enacted similar laws are Connecticut, California, Iowa, Nevada, New Jersey, and Washington.

Except in Indiana and in California little or nothing has been done to carry out these laws. Their constitutionality is in question. Attorneys-general for the several states do not seem anxious to defend suits and appear to encourage delay in putting the laws into operation, and in Indiana, where for seven or eight years vasectomy was practised without law and exclusively at the request or with the consent of the person operated upon, and for two years thereafter under the law of 1907 compulsorily, there have been no operations since 1909 except a very few cases at their own request, not ten in all.

In New Jersey a suit is pending in the Supreme Court to determine the right of the state to have sterilized certain confirmed criminals, insane, epileptics, and feeble-minded persons who have been certified by the State Commission as proper subjects for the operation. As the entering of a suit stays the execution of the law, it seems likely that these cases may not be pressed for trial for some time, unless a strong public interest should demand a speedy adjudication. Such interest is not apparent at present.

An eminent legal authority of New York City, Mr. Louis Marshall, has given this committee his views about the constitutionality of the law so far as it relates to criminals. He says (I quote in part):—

"Except so far as prohibited by the constitutional prohibition against the imposition of cruel and unusual punishment, I believe that it is within the power of the State to inflict the death penalty in such cases as at common law were subject to that punishment, and to impose imprisonment up to the limit of incarceration for life, due regard being had to the nature and character of the crime sought to be punished."

"The prohibition against the infliction of cruel and inhuman punishment is difficult of precise definition. It is generally understood to have reference to the imposition of torture, of a punishment which is barbarous and wanton and repugnant to the public conscience. Electrocution has been held not to constitute cruel and unusual punishment within the inhibition of the Constitution, in People ex rel Kemmler v. Durston, 119 N. Y. 559, Affd. 136 U. S. 436, 446. The decapitation of a hand of a kleptomaniac, the branding of one who has committed the crime of burglary, or the amputation of the sexual organs of one guilty of adultery, would, doubtless, in this age, be deemed cruel and unusual punishment."

"I understand that the operation of vasectomy is painless and has no effect upon the person upon whom it is imposed, other than to render it

ANALYSIS OF EXISTING STERILIZATION LAWS, 1912.

STATE.	DATE.	PERSONS SUBJECT.	HOW SELECTED.	TYPE OF OPERATION.	STATE'S MOTIVE.
1. INDIANA	1907	Inmates of all State Institutions deemed by commission of three surgeons to be unimprovable mentally and physically, and unfit for procreation.	Option of commission within the classes subject.	Any type at option of commission	Purely Eugenic
2. WASHINGTON	1909	Habitual criminals and persons adjudged guilty of carnal abuse of female persons under 10 years of age, or of rape.	Order of court passing sentence for offence.	Any operation for the prevention of procreation.	Purely punitive
3. CALIFORNIA	1909	Inmates of State Hospitals and Homes for Feeble-Minded, and inmates of State Prisons committed for life or showing sex or moral perversion or Twice committed for sexual offenses or three Times for other crimes	Recommendation of Superintendent or resident physician to a board consisting of himself and three General Superintendents and Secretary of state Board of Health.	Asexualization	For the physical, mental or moral benefit of inmate.
4. CONNECTICUT	1909	Inmates of State Prisons and of State Hospitals at Middletown and Norwich	Selected by a board of three surgeons-(the resident physician and two others appointed by the Superintendent of the institution)-for each institution on the basis of mental and physical conditions and family history	Vasectomy or oöphorectomy in a safe and humane manner	Mainly Eugenic; also therapeutic
5. NEVADA	1911	Habitual criminals & persons adjudged guilty of carnal abuse of female persons under 10 yrs of age and of rape	Order of court passing sentence for offence	Any operation for the prevention of procreation except castration	Purely punitive
6. IOWA	1911	Inmates of public institutions for criminals, idiots, feeble-minded imbeciles, drunkards, drug fiends, epileptics, syphilitics, etc	By annual examination by managing officers of each institution deemed inadvisable to allow to procreate or decided a sex or moral pervert. Board of Parole orders heads of institutions to perform operation	Vasectomy or salpingectomy.	Purely Eugenic
7. NEW JERSEY	1911	Inmates of state reformatories, charitable and penal institutions (rapist and confirmed criminals).	Basis of selection - Physical & mental conditions and heritable defectiveness selected by unanimous vote of Board of Examiners-Commissioner of Charities & Corrections and one surgeon and one neurologist (the latter appointed by the governor for 3 yrs) And the chief physician of the institution Inmate proposed by Supt. or by Boards own action Orders subject to a revision by any court of justice	Any type of operation for the prevention of procreation as determined by Board of Examiners.	Purely Eugenic
8. NEW YORK	1912	Inmates of State Hospitals for the insane, state prisons reformatories and charitable institutions and rapists and confirmed criminals in penal institutions.	Basis of selection:- Physical and mental conditions and inheritable defectiveness Board of examiners consisting of - 1 surgeon, 1 neurologist and a practitioner of medicine appointed for 6 years by the Governor. Order subject to Court review	Any operation for the prevention of procreation. Type determined by Board of Examiners	Purely Eugenic
SUGGESTED EXPERIMENTAL STATE LAW	—	Inmates of all State and Municipal Hospitals for the Insane, Institutions for the Feeble-minded, Epileptic and Inebriate, Reformatories, charitable and penal institutions.	Every inmate just prior to release provided it is deemed eugenically advisable by a Eugenics Board and can be shown by said Board to the satisfaction of a Court of Justice, that the candidate for release is a person with a germ-plasm carrying determiners for anti-social traits Eugenics Board to consist of the persons, experts: recruiting in pathology, psychiatry, psychology, social-work and heredity	Sterilization- Type determined by the Eugenics Board at time of recommendation for sterilization.	Purely Eugenic.

impossible for him to have progeny. If it could be said that such a punishment would only be inflicted in the case of confirmed criminals, there would be strong reasons, founded on considerations of public welfare, which would justify its imposition. The danger, however, is that it might be inflicted upon one who is not an habitual criminal, who might have been a victim of circumstances, and who could be reformed. To deprive such an individual of all hope of progeny, would approach closely to the line of cruel and unusual punishment. There are cases where juvenile offenders have been rendered habitual criminals who subsequently became exemplary citizens. It is true that these cases are infrequent, and yet the very fact that they exist would require the exercise of extreme caution in determining whether such a punishment is constitutional."

"Although not entirely certain as to this phase of the case, I have no doubt the imposition of such a penalty by a commission or a state board, or by any tribunal other than a court which is to determine the penalty for the offence of which one charged with crime has been convicted, would be unconstitutional. The determination that such an operation shall be performed necessarily involves the infliction of a penalty. Unless justified by a conviction for crime, it would be a wanton and unauthorized act and an unwarranted deprivation of the liberty of the citizen. In order to justify it, the person upon whom the operation is to be performed has, therefore, the right to insist upon his right to due process of law. That right is withheld if vasectomy is directed, not by the court which imposes the penalty for the crime, but by a board of commission, which acts upon its own initiative, or which, under a general provision of law, undertakes to determine whether or not the operation shall be performed on a specific individual."

"So in regard to the legislation which you now have under consideration, it is my firm opinion that the court which imposes the sentence upon the prisoner can alone impose the penalty of vasectomy, the prisoner being first accorded an opportunity to be heard by the court on the question as to whether or not such punishment shall be inflicted."

"I fear that the public is not, as yet, prepared to deal with this problem; it requires education on the subject. I cannot, however, refrain from expressing the general opinion that the movement is one which is based on sound considerations. The difficulty is, however, in adopting proper safeguards to adequately protect those who are not hopelessly confirmed criminals, degenerates, or defectives."

4.—*Sterilization in Indiana and California.*

It appears that there have been many more cases of sterilization of different types within institutions, for purely medical or for a combination of medical and Eugenic reasons, usually with the consent of the parents or guardians, without specific legislative authority, than have been performed under the statutes. Thus, in some of the institutions of Pennsylvania,

Kansas, Idaho, Virginia, and Massachusetts, none of which states has a sterilization law, there have been sterilized a considerable number of individuals. Up to the present time the only official records of operations under legal authority are those of the 125 or 130 men vasectomized in the Jeffersonville (Indiana) Reformatory during the years 1907 and 1908, and the 220 persons, both males and females, asexualized in the California institutions since November, 1910.

Indiana was the first (1907) of the several states to pass a law legislating Eugenic sterilization. In order to obtain a first hand report of the history of the movement and to observe at close range the actual working of the law, a sub-committee of the sterilization committee, consisting of the Chairman and Secretary, visited the Jeffersonville (Indiana) Reformatory in January, 1912, this being the only institution in Indiana attempting to enforce the law. Due credit must be given to Dr. H. C. Sharp, Surgeon at the Reformatory, during the agitation for and the execution of the law, for energetically promoting and courageously trying this important Eugenic experiment. The committee was courteously received by Dr. David C. Peyton, Superintendent of the Institution, who was one of the chief advocates of the law, and every opportunity for thorough investigation was given. Three cases of vasectomy were performed on voluntary candidates for the instruction of the committee. More than a dozen sterilized men in the Reformatory were examined by the committee with the view to determining their physical, mental, and moral make-up, with especial reference to the effects of vasectomy on the sexually perverted instincts and practices; and a trained investigator was left in charge to complete the case history records, and to study the family histories of the vasectomized men in their home territories. All of these cases of vasectomy were performed by Dr. H. C. Sharp, Surgeon of the Jeffersonville Reformatory, who was also the chief advocate of the law, and is now a member of the board of control of the Jeffersonville Reformatory. His first operation was performed in 1899, eight years before the enactment of the law, and during this interval the operation was performed by him on 176 men at their own request. In 1907 and 1908 about 125 compulsory operations were performed, until the inauguration of Governor Marshall in January, 1909.

Dr. F. W. Hatch, General Superintendent of the California hospitals for the insane, under date of June 21st, 1912, reports the following situation in regard to sterilization in California:—

"The law of California authorizing asexualization is by no means a perfect law, and yet this very imperfection has been the means possibly of acquainting a portion of the public of the probabilities and benefits of the operation."

"In putting the law in action in the State Hospitals we have proceeded cautiously and avoided in the great majority of cases any arbitrary action in compelling patients to submit to the operation. It has been recognized as a

very radical change in methods, a proceeding about which there was very much disagreement and some considerable feeling. Our plan of proceeding with the work follows an agreement with the Secretary of the State Board of Health and myself, that relatives, where possible, should be consulted, the operation explained to them, and their written consent obtained before the work was performed. In many cases where relatives were not to be located and where patients were on the road to recovery and in a state to sensibly consider the subject, we have obtained the consent of patients. In a few rare cases we have operated against the wish of the patients."

"The Superintendent of a hospital having cases that he believes should be operated upon, takes the case up with the father, mother, husband, or wife, as the case may be, either by letter or personal interview and explains the desirability of the operation, its result, its possible dangers. Consent having been obtained from the nearest relative or relatives, a history of the case with the recommendation of the medical superintendent is sent to my office where the report is considered by the Secretary of the State Board of Health and myself, and our consent granted, if in our opinion it is desirable. The superintendent on being notified of our consent, proceeds with the operation, a report of the work being sent to and kept on file in the office of the Lunacy Commission."

"Among those of the male sex the operation is uniformly a vasectomy: a local anasthetic is used; the lower end of the vas is left open so that the spermatozoa are discharged into the sac and reabsorbed into the general system."

"In the women the usual operation is a salpingectomy, though an occasional oophorectomy is done in cases where diseased conditions seem to indicate it."

"In all there are 94 women operated upon."

"There has been one death in a case complicated by an appendectomy in which an acute nephritis developed a few days after the operation."

"In all, since November, 1910, there have been performed 220 asexualizations. Of those operated upon, 34 were 19 years of age or under; forty-five were from 20 to 24 years of age, and 54 were from 25 to 29 years old; 37 were from 30 to 34 years. Forty-seven of the women were married, 38 single. A large proportion of the men were single, 76 of them being 29 years of age or under. Fifty per cent. of the men had either an insane or alcoholic inheritance that could be ascertained. Many of those operated upon have been discharged and are living at home in comfort. As a general rule all are benefited to some extent by the operation. In some of the vasectomy cases but little improvement in the mental condition is to be noted. We endeavour to keep track of those who are discharged and receive reports from time to time. We have found no ill effects. No interference has been noted in the marital relations."

"Properly applied, I believe that sterilization will be of great benefit to humanity if generally adopted."

"Investigation has made it probable that about 30 per cent. of the general population carry the neuropathic taint; this, of course, includes those under detention probably a little more than one per cent."

"At the present time Indiana, Iowa, Connecticut, Utah, and New Jersey have laws legalizing sterilization and asexualization; but with the exception of Indiana and California little work has been done."

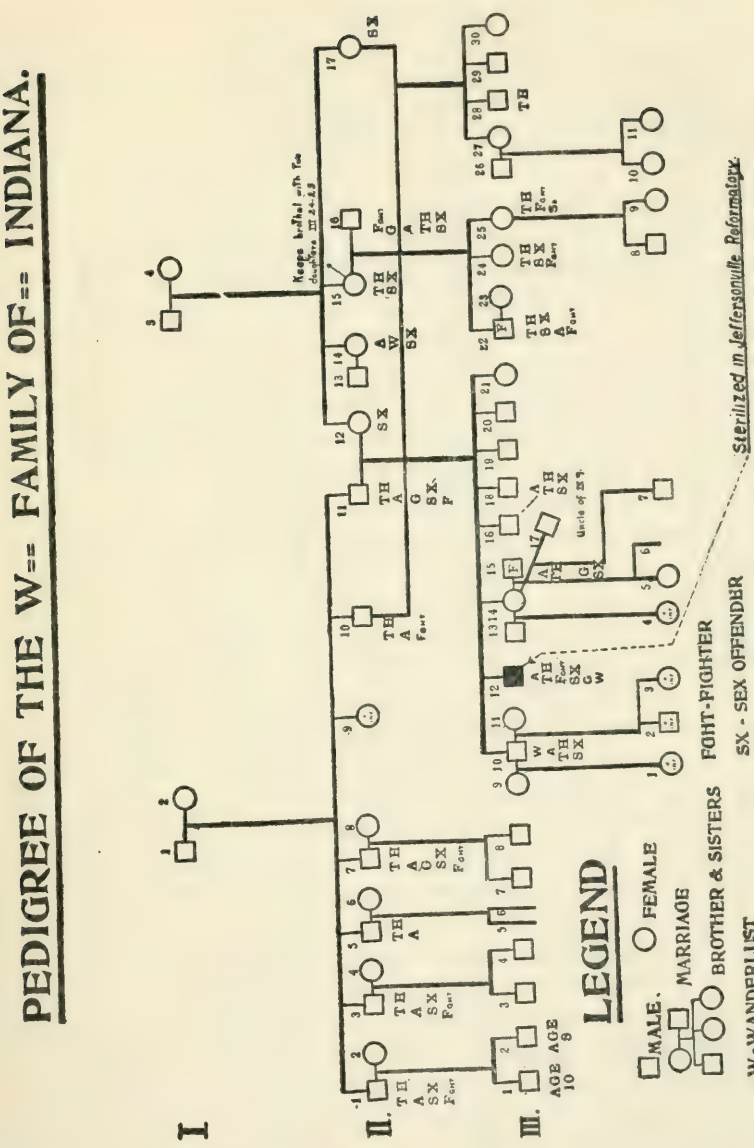
"There is no question but sterilization of confirmed criminals, habitual drunkards and drug habitues, epileptics, sexual and moral perverts in reformatories and other places of detention, those suffering from acute recurrent psychosis, is a proper proceeding, and for the benefit of mankind."

"The figures on heredity that I have given do not fairly represent the actual amount of inheritance as in many cases we could obtain no family history, though the character of the mental affection would indicate previous disease in ancestry. In our experience in this State we find very much less trouble in obtaining consent of relatives at the present time than when we first commenced the work. It is apparent that the public are being educated up to the value of the work."

The following pedigree and description of traits were obtained at first hand by our committee (*see page 471*) and records the family and individual history of a defective individual (III.-12) sterilized in the Jeffersonville (Indiana) Reformatory. Note the general prevalence of wanderlust, alcoholism, low mentality, sex offence, thievish instincts, and other defects. The individual (III.-12) is of Dutch-American descent, born in the United States, age 24 at the date of operation which was performed in the Jeffersonville (Indiana) Reformatory in 1906 at his own request after hearing the subject discussed by two officers of the institution. He wished to decrease his sexual desires, which were constant and excessive, also to avoid the possibility of having children. He was a sexual pervert of a pronounced type, and realized (he said) his bad heredity, and did not wish his kind perpetuated. He had been a criminal from his earliest days, and much of his life had been spent in institutions. No education, except as obtained there. Of slow intelligence. He claimed (1912) to have improved in mind and body after vasectomy, to have gained in weight, in strength, and in power to concentrate. Sleeps better, less nervous, decrease of over-sexuality. Still sexually perverted, however, as shown by his conduct in prison now.

The purpose of this particular study of the individual and family history was to determine whether or not in sterilizing this individual (III.-12) the State effected the cutting off of at least one line of defective inheritance. The committee feels justified in reporting an affirmative answer.

This history is fairly typical of some thirty similar records of men who were sterilized in the Jeffersonville (Indiana) Reformatory from six years to two weeks before their respective cases were observed and described.



From these and other similar records, it would appear that vasectomy of the adult male criminal :—

1. Causes little or no physiological change other than effective sterilization. This, however, is not in all cases permanent.

2. Effects practically no change in sex instincts, and little in sex habits.

3. May have a beneficial mental effect for the time being in aiding the patient to concentrate more on other interests and throw off sexual obsessions.

5.—*Effects of Sterilization.*

Many thousands of sterilization operations have been performed by surgeons in both private and institutional practice. As a rule, these operations have been for purely pathological reasons, and it has been found difficult to obtain authentic records of the more remote effects of these operations. As a matter of fact, records of the effects of such operations extending over a long period of time do not exist to any great extent. As a rule, when a patient has made a satisfactory recovery, the case is dismissed, and the surgeon has no further knowledge of it. The committee has, however, begun the collection of first hand records of cases of sterilization of different types on different types of people at different ages, and in different conditions. The following table explains the nature of the types of operations, and the sorts of people operated upon, the case histories of which it will be necessary to secure in numbers great enough to justify generalization as to the immediate and remote effects.

The committee hopes to secure at first hand some 30 or more cases describing in detail the effects of the operation in each of the several group-combinations above charted. It will be seen that this calls for a grouping into 40 classes, and that some twelve hundred case histories must be secured. Up to the present time (June 26, 1912) the committee has secured over one hundred such histories scattered over the grouping above mentioned. Of this number, however, 31 are of criminalistic males vasectomized after puberty. It was this group of cases that enabled the committee to make the generalizations in connection with the W———— case above reported. There are accessible, of course, cases of sterilization in medical literature, but since this study seeks primarily the effects of the operation on so many different traits, the principal data used must come from first hand observations. It might be of interest to record that the cases thus far reported verify the general conception of the effects of sterilization, namely, that castration or ovariotomy in young individuals stops development of the secondary sexual characteristics. That a sterilizing operation of any sort in adults effects but little change in habits and structure previously formed. One case history is of a man injured at the age of 11 years in such a manner that the testicles ceased growing. The sex instinct is entirely absent in this man now 54 years of age. The pubic and axillary hair did not develop. No beard grew on the face. The hair on the head was fine, the voice tenor. The general appearance was neither decidedly that of a man nor a woman. This same man had a nephew who was injured in the South African War, and was castrated at 21 years of age. As far as our records go, it appears that this individual did not experience a diminution of sex instincts nor a change in sex habits, nor any marked change in mind or body. It also appears from several case histories that ovariotomy does not diminish sex instincts of erotic women; that eight cases of castration of feeble-minded

NORMAL PERSONS NEUROPATHIC PERSONS CRIMINALISTIC PERSONS FEEBLE-MINDED PERSONS VENEREALLY AFFECTED PERSONS

Permanent effects on	MALES	FEMALES	MALES	FEMALES	MALES	FEMALES	MALES	FEMALES	MALES	FEMALES
	VASECTOMY	SALPINGECTOMY	VASECTOMY	SALPINGECTOMY	VASECTOMY	SALPINGECTOMY	VASECTOMY	SALPINGECTOMY	VASECTOMY	SALPINGECTOMY
	BEFORE PUBERTY (Cases)	BEFORE PUBERTY (Cases)	BEFORE PUBERTY (Cases)	BEFORE PUBERTY (Cases)	BEFORE PUBERTY (Cases)	BEFORE PUBERTY (Cases)	BEFORE PUBERTY (Cases)	BEFORE PUBERTY (Cases)	BEFORE PUBERTY (Cases)	BEFORE PUBERTY (Cases)
a. Fecundity										
b. Weight										
c. Health and Strength										
d. Vision										
e. Development of Sex Organs										
f. Sex Instinct										
g. Sex Control										
h. Mental Clearness										
i. Courage										
j. Economic Conditions										
	AFTER PUBERTY (Cases)	AFTER PUBERTY (Cases)	AFTER PUBERTY (Cases)	AFTER PUBERTY (Cases)	AFTER PUBERTY (Cases)	AFTER PUBERTY (Cases)	AFTER PUBERTY (Cases)	AFTER PUBERTY (Cases)	AFTER PUBERTY (Cases)	AFTER PUBERTY (Cases)
a. Fecundity										
b. Weight										
c. Health and Strength										
d. Vision										
e. Development of Sex Organs										
f. Sex Instinct										
g. Sex Control										
h. Mental Clearness										
i. Courage										
j. Economic Conditions										
	CASTRATION	OVARIOTOMY	CASTRATION	OVARIOTOMY	CASTRATION	OVARIOTOMY	CASTRATION	OVARIOTOMY	CASTRATION	OVARIOTOMY
	BEFORE PUBERTY (Cases)	BEFORE PUBERTY (Cases)	BEFORE PUBERTY (Cases)	BEFORE PUBERTY (Cases)	BEFORE PUBERTY (Cases)	BEFORE PUBERTY (Cases)	BEFORE PUBERTY (Cases)	BEFORE PUBERTY (Cases)	BEFORE PUBERTY (Cases)	BEFORE PUBERTY (Cases)
a. Fecundity										
b. Weight										
c. Health and Strength										
d. Vision										
e. Development of Sex Organs										
f. Sex Instinct										
g. Sex Control										
h. Mental Clearness										
i. Courage										
j. Economic Conditions										
	AFTER PUBERTY (Cases)	AFTER PUBERTY (Cases)	AFTER PUBERTY (Cases)	AFTER PUBERTY (Cases)	AFTER PUBERTY (Cases)	AFTER PUBERTY (Cases)	AFTER PUBERTY (Cases)	AFTER PUBERTY (Cases)	AFTER PUBERTY (Cases)	AFTER PUBERTY (Cases)
a. Fecundity										
b. Weight										
c. Health and Strength										
d. Vision										
e. Development of Sex Organs										
f. Sex Instinct										
g. Sex Control										
h. Mental Clearness										
i. Courage										
j. Economic Conditions										

boys and young men reported by Dr. H. H. Goddard, Vineland, N.J., showed, at the expiration of two years, no effects solely attributable to castration. The committee begs to state that this phase of the investigation will continue until the generalizations called for by the above table can be made from first hand evidence.

6.—*An Example of Eugenic Vasectomy in a State not having a Specific Law Authorizing Sterilization.*

Case and family history of H————, an inmate of the Boston State Hospital for the Insane. The patient is 42 years of age, a native of Ireland, had been committed to an insane hospital before coming to America. Good habits, steady worker, can earn ten dollars a week in low grade shipping work. The wife of the patient is of a decidedly inferior make-up, but is a good mother, and keeps a clean and orderly house. She said that they had all the children they could provide for, and that they do not want any more, but realised that probably more would come. The following table shows the nature of the offspring of the patient, subject to attacks of insanity, and of his wife, an individual of decided inferiority :— (*see page 475.*)

After a few months' treatment it was found that the patient had apparently recovered, and was able to go back to the industrial world, and it was learned that he could secure his old position at ten dollars a week. Meanwhile the patient was a State expense, his family was dependent upon charity. The only objection to his release was the danger of propagating more children of the sort already produced. Vasectomy was proposed, but he objected. The wife was brought in, and the patient, the hospital authorities, and the wife held a conference. Vasectomy was finally agreed to by the man, and was performed (April, 1912) and the patient discharged.

This is an actual, quite recent case illustrating the manner in which institution authorities may promote Eugenic ends by sterilizing certain types of defectives without the aid of a specific sterilization law, and be entirely within their legal rights as custodians of defectives and degenerates, and protectors of society.

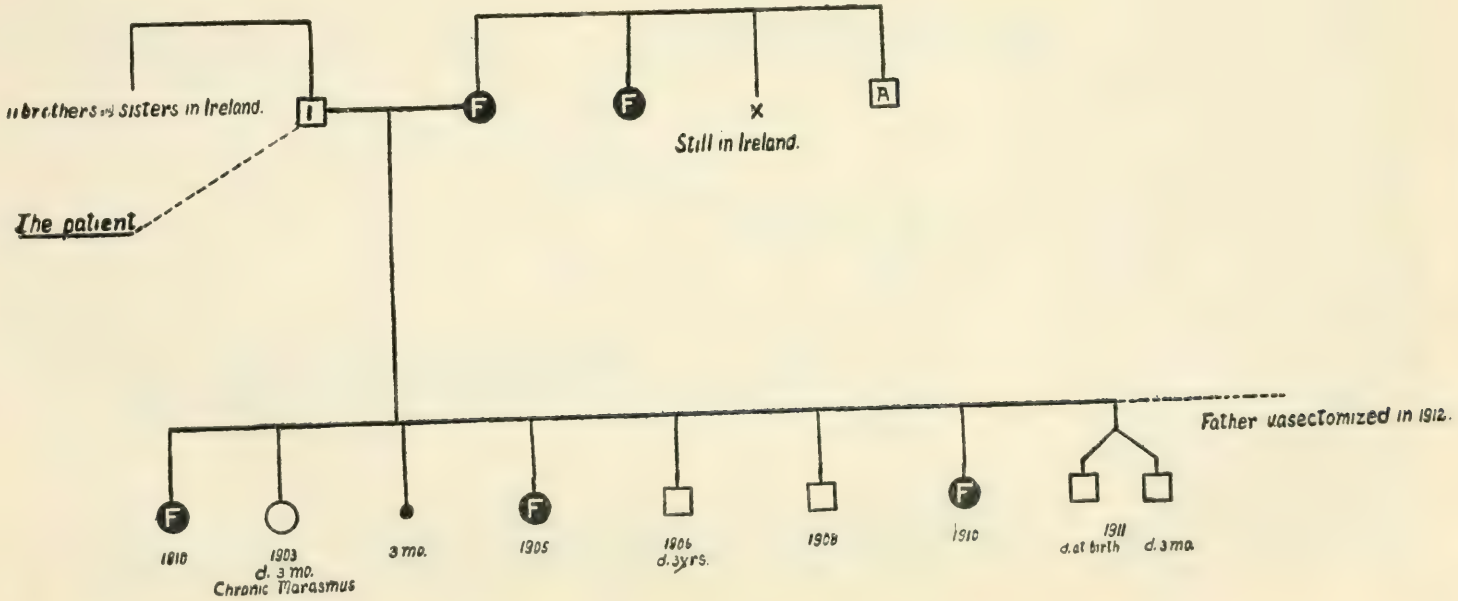
7.—*A Suggestion derived from Observations in Thremmatology.*

Except for the cases recorded in California, no females have been sterilized under any of the sterilization laws. This fact has its biological bearings, as follows :—

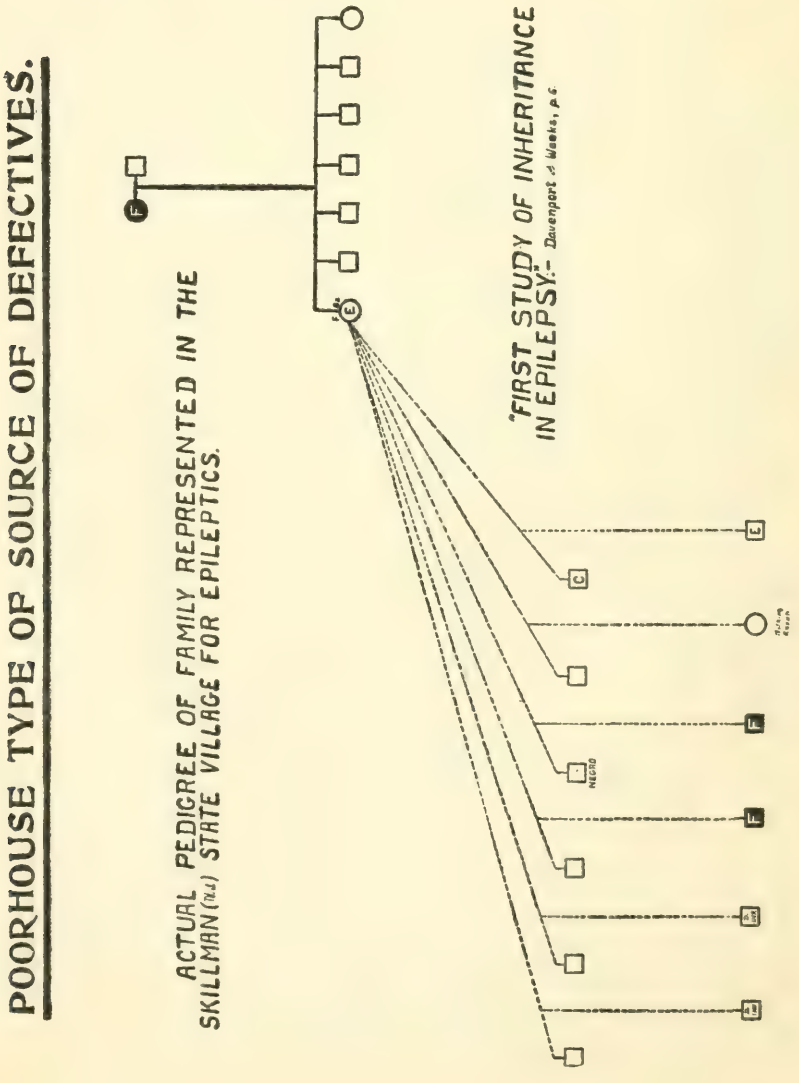
In the breeding of the higher and more valuable types of domestic animals, such as horses and cattle, sterilization of surplus males is one custom universally practised. The females of these animals are well cared for and protected from free union with the males; selected matings are the rule. However, in the case of domestic animals of less value, having mongrel and homeless strains and individuals, such as the dog and the cat,

THE M__H__PEDIGREE

Showing the sort of offspring being produced by an insane man until he was sterilized, upon being discharged after a short commitment in the Boston State Hospital.



the cutting off of their supply is largely effected through the destruction of the females. As a rule the tax on a female dog is two or three times greater than that on a male dog. The females of this homeless species are not protected, and consequently they increase very rapidly. Consorting freely with equally worthless mates, the progeny of such individuals are often excessive in numbers, and of a worthless mongrel sort. Would the castration of one-half of the male mongrel dogs effect a substantial reduction in the number of mongrel pups born? If not, in an effective sterilization program, would it not be necessary that the unprotected females of the socially unfit classes should be sterilized in relatively large numbers?


POORHOUSE TYPE OF SOURCE OF DEFECTIVES.
ACTUAL PEDIGREE OF FAMILY REPRESENTED IN THE SKILLMAN (Ind.) STATE VILLAGE FOR EPILEPTICS.
FIRST STUDY OF INHERITANCE IN EPILEPSY:- Davenport & Weeks, p 6
F
E
C
NEGRO

As a case in point, the following pedigree illustrates the manner of increase of defective children from defective women. This is an actual example of the type of pedigree so common that it has become known to students of heredity as the " almshouse "* type—a sad commentary on the general ineffectiveness of such institutions :—(*see page 476.*)

" The central figure is a feeble-minded woman subject to epileptic fits, descended from a feeble-minded mother and a shiftless, worthless father. She has spent most of her life in the almshouse, and all of her children have been inmates. One is by a negro whom she met in the almshouse. Two of the children died in infancy ; one, of whom little is known, died at the age of 18. Of the remainder, two are feeble-minded, and one, from a sire of criminal tendencies, is an epileptic imbecile." (" *Inheritance of Epilepsy,*" Davenport and Weeks, p. 5.)

8.—*Public Opinion.*

While it is true that much public interest has developed in the past few years on the subject of sterilization as a Eugenic measure, and periodical literature discussing it has multiplied, it must still be recognised that there is, as yet, no considerable number of people committed to its propaganda. The laws already enacted have usually been put through by some very small energetic group of enthusiasts, who have had influence in the legislatures. In at least two of the States it was chiefly the work of a physician. In one, of a woman. It is, therefore, easy to understand why little has been actually done. The machinery of administration has to be created. It was a new and untried proposition. Public sentiment demanding action was absent. Law officers of the state were not anxious to undertake the defence of a law the constitutionality of which was questioned. So we must frankly confess that what has sometimes seemed to be, and has been heralded in some quarters as a remarkable development in this movement for race betterment, is, as yet, little more than the hobby of a few groups of people, and does not really indicate the adoption of a settled policy. It is evident that active hostility and opposition will arise as soon as there is any attempt to carry out the laws in a thorough-going manner. Much more extensive education of the public will be necessary before the practice of sterilization can be carried to the extent which will make it a factor of importance in any Eugenic program.

It has been said that the Roman Catholic Church is strongly opposed to sterilization. From Catholic sources, we learn, first, that the Church has no dogma on the subject, and, second, that among the prelates of the Church and the priesthood there are held opposing views. For a year and a half, during 1910 and 1911, an active controversy was carried on in the pages of the " American Ecclesiastical Review " on this subject. There were five

*Almshouse is equivalent to English Workhouse.

principal controversialists, two (Fathers Donovan and Leboure) were proponents, three (Fathers de Becker, Rigby, and Schmitt) opponents. The arguments were generally in Latin, and centred about these points, viz., the right of a Catholic physician to perform the operation of vasectomy or castration for any but a pathological reason; the right of an individual to submit to such an operation voluntarily for any but a medical necessity; the right of the State (from the ecclesiastical point of view) to permanently deprive an individual of an inherent and God-given right which he would otherwise enjoy by civil law, if society can be protected from his misdeeds by any other methods; and finally, "is vasectomy a mutilation?" The arguments were for the most part theological, and no conclusions appear to have been reached on any of these points, both sides leaving off practically where they began. The preponderance of Roman Catholic sentiment, however, at the present time is undoubtedly opposed to any form of sterilization as a Eugenic measure. In Pennsylvania it is said a sterilization bill was defeated in the Legislature solely by the strong opposition of one Roman Catholic member, who considered it an unjustifiable mutilation.

Among social workers, professional and otherwise, there appears to be a growing interest in sterilization, but doubt about its practicability. It is thought of as more or less brutal. By some the eugenist's attitude is represented as being opposed to humanitarian efforts for the amelioration of conditions of life which burden and handicap the masses, and finally submerge the "tenth." Dr. Edward T. Devine, Professor of Sociology in Columbia University, in an impassioned address at the annual dinner of the Academy of Political Science in New York, recently said: "There are those . . . . who have been making extraordinary applications of this Eugenics idea, who have been telling us that philanthropy, the improvement of social conditions, the prevention of child labour, the elimination of infectious diseases, and the like, are to be condemned as contrary to the fundamental and vital interests of the race. Just as in the past war, famine and pestilence were essential to progress . . . , so now we have the slums, tuberculosis, typhoid, industrial accidents, child labour, a twelve-hour day, and a seven day week . . . performing in our day the same beneficent functions." After a vigorous protest against this doctrine, he closed thus: "our last word is of rehabilitation, reintegration, redemption."

The committee has recently received letters from the Governors of Vermont and Kentucky asking for information regarding legislation, and strongly endorsing the proposition that defectives, degenerates, and confirmed criminals should be sterilized. Both hope soon to secure legislation in their respective States legalizing the operation. From officials in several other States inquiries have been received regarding legislation and what has been done elsewhere. It seems probable, therefore, that similar laws will soon be enacted in other States.

9.—*Summing up of the Preliminary Study.*

This is only a preliminary report, and we have touched in a desultory way upon only a few of the many aspects of our subject worthy of consideration. While we do not feel justified in offering conclusions based upon the data already accumulated, we may say tentatively that such as we have seem to indicate :—

1st. That the sterilization of the adult male by vasectomy is a simple, practicable method of preventing procreation by him without otherwise interfering with his sexual functions, but that it is not certainly permanent in this respect. Castration only is sure.

2nd. That sterilization of the adult female by either salpingectomy (ligating or excising), ovariotomy, or hysterectomy, or all three, is never wholly free from danger to life or to disturbance of other bodily and mental functions. Modern surgery and hospital care have greatly reduced these dangers, but they still exist.

3rd. That sterilization of adults by any of these processes does not appear greatly to modify previous sex characteristics, and habits. In females sexual passion is sometimes increased. In males more often somewhat mitigated.

4th. That there is little probability that sexual immorality would be encouraged or increased as a result of the sterilization of those manifestly unfit for parenthood. Our investigations indicate that such persons seldom are deterred from immoral practices by any consideration which sterilizing would remove.

5th. That our knowledge is, as yet, so limited that only a few types could safely be selected at the present time as suitable for compulsory sterilization. Individuals of these types would generally require more or less custodial care throughout life, whether sterilized or not, but their sterilization would be an insurance against unworthy progeny, and so eugenically of value.

6th. That vasectomy may become a Eugenic measure of considerable value if practised under the general protection of law, but by persuasion and with the consent of the individual (or his guardians) who is unfitted for parenthood, instead of by compulsion. That this consent can often be obtained, when conditions warrant it, has been clearly shown.

7th. That the sterilization laws already enacted in United States will have to undergo vigorous attacks before the highest courts before many more compulsory operations are performed, with the probability that there will eventually be material modifications of them.

SECTION IIA.

EUGENICS AND THE NEW SOCIAL CONSCIOUSNESS.

By SAMUEL G. SMITH,

Professor of Sociology, Minnesota University, U.S.A.

Eugenics is a new word, but it is not a new idea. The Greeks and Hebrews were both interested in the subject, but it finds itself to-day in new company. Formerly it was dealt with by philosophers, theologians, poets, and prophets. In our time its guardianship has been assumed by men of science. When Plato wrote his Republic it was a treatise on Eugenics, and the aspiration for a better race was the foundation of the message of Jesus when he preached the Kingdom of God. Plato thought it could be achieved by new organization. Jesus preached repentance as its gateway. Modern Science has taken largely, perhaps too largely, its inspiration from biology, and wishes to produce a better man by making him an animal of finer breed.

In the section devoted to Public Education it is not so needful to find out exactly what we know, although that is important, but our chief interest is in discovering what we can wisely teach. It would be unfair to indicate that the scientific appeal is paramount, for the philanthropist and the statesman, as well as the whole brood of reformers, are equally interested. As science seeks to find out what the fact is, and philosophy to show what it means, so the present practical aim is to discover what useful thing may be done in view of the knowledge that we have and the social circumstances in which we are placed.

My countryman, Mr. Lester F. Ward, who, I think, was the first writer to point out the importance of psychical forces in the development of society, somewhere states that human history has hitherto progressed by the forces of human passions which were largely unconscious and uncontrolled, but that the time has come for the conscious guidance of future life and action, of which movement sociology is to be the prophet. It may not be quite true that men in the past did not see more than a step at a time, but it is widely true that modern life is characterised by a social consciousness hitherto unknown; and this has much to do with making the half developed science of eugenics a practical art among associated men and women.

The new social consciousness finds itself first in the larger powers and duties assumed by the modern State. Without attempting to trace the history of institutions, it is evident that the relation of the three primary forms of human society—the Family, the Church, and the State—have undergone profound modifications in modern times. Broadly speaking,

the State assumes the control of the Church in economic questions in almost every country. The secularisation of Church property enriching the State, at least for a time, has also thrown upon our political institutions a weight of enormous burden; and not content with assuming the ancient duties of caring for the sick and the aged, some countries at least are undertaking not only to furnish education, but the opportunity of toil, or at least a moderate degree of the results of successful toil. This is not the time to discuss the wisdom of these efforts, but at any rate the modern state seems disposed to hesitate at no undertaking to secure the well-being of its people.

If the State has assumed authority over the Church in all temporal matters, its conquest of the home is still more complete. Time was when the English law declared a man's house was his castle, if it was only a cottage; but that time lies far behind us. The State interposes, not alone to regulate parental authority, but to prescribe domestic duties. In highly civilised communities the law sets the standard of education, of comfort, and of character. It is difficult to limit parenthood, but it is easy to transfer the custody of the child from the parent and make him the ward of the State. The State, therefore, takes charge not only of the dependent and the delinquent child, but also the child of every parent faithless to the social standards prescribed by law. These suggestions indicate that in the modern state we have an organisation that would not hesitate to grapple with the problems of making a better race if only the path could be surely pointed out.

In passing, it may be useful to suggest that the new social conciousness is not confined to the larger state. It vitally affects persons and groups of persons within the state. The old order of life laid down society in strata, but our modern times have brought in a multitude of new interests, and there is developing a new kind of democracy, growing out of the participation of people who differ in political or economic advantage, but who come together in groups on account of artistic, literary, and scientific interests. The social spirit is helped by every opportunity for its expression, and there is not only a political consciousness in the modern State, but there is a very effective social consciousness, justly, though perhaps vaguely, characterised by the expression—the social mind. This social mind, made up of those ideas, faiths, and emotions which the social group holds in common, seeks to conquer every individual within its limits and to impose upon him definite standards of thought and conduct.

We are not seeking to build a republic as Plato was, nor with Sir Thomas More map out the geography of some Utopia. We wish to use the institutions that we have; nor will we, like St. Augustine, take refuge from a broken world in some ideal "City of God."

The problem of parenthood was not absent from the Greek mind; but it comes to us in an entirely new way because we are, at any rate, more tender-hearted, whether or not we are so clear-sighted.

One of the futilities of practical discussion is the supposition on the part of some people that if marriage be made difficult for the unfit, the race will thereby be improved. To this belief belong all the laws which are proposed for physical examination, tests and measurements preliminary to forming a home. It seems to me that all such proposals are at once excluded from the domain of practical considerations when we remember that wherever marriage is made difficult, either by law or by a high standard of living, immorality increases. Maternity and marriage are by no means synonymous. Where the State has decided that a certain class of persons are unfit to become parents, custodial care is indicated. Enlightened States have already agreed that the feeble-minded, the insane, and the pauper must not be allowed to become parents. Recent studies indicate that where the father and mother are both feeble-minded, the child is sure to be mentally deficient. The only remedy is for the State to restrain the feeble-minded woman. Germany and Austria forbid marriages to recipients of poor relief, and it is quite evident that these laws are based upon a sound judgment.

The case of the criminal is by no means so clear. Practical experience among convicts shows that a good many of them are deficient in intelligence; it might be more correct to say that numbers of them fail to adopt the ordinary social judgments with respect to conduct. It is by no means clear that there is any such relation of heredity among criminals as exists among the feeble-minded. Professor Gould gives an account of an enquiry in France extending from 1850 to 1860 into the family history of all prisoners tried in courts. As a result of this enquiry it was found that the number having previous convictions in their direct families varies from 12 to 19 per 1,000. The lowest figure was about the same as the number from the normal population. In other words, the investigation showed that if France was to be rid of crime on the theory that it was a family inheritance, it could only be done by incarcerating the whole population. The fact is that pathological specimens are found in all classes of society and from every grade of family life. It will be well for us to remember that the facts are not all in, and that the problems of eugenics cannot all be solved in the present generation.

One of the values of public education and discussion will be exhibited in the creation of a new ethical sense on the part of the individual with respect to his own relations to the social group. The teaching of sex hygiene to young persons of suitable age and perfect candour in regard to the danger of sex disease are important; but perhaps of even more value is the more elemental view of the proper terms of human marriage. So long as women love strength and men love beauty, and mating is upon the terms of preference, the human instinct does not go far wrong. Social and commercial conventions are as great impediments to proper marriage as a lack of knowledge as to fitness of temperament and organisation.

Sir Francis Galton uttered a pregnant sentence when he declared "the science of heredity is concerned with large populations rather than with individuals." This is not a question for the microscope; it involves a study of the nature of those forces which bring greatness to the social group. The strength of the social group is measured in no physical terms, but in its ideas, its passions, its ambitions; the social group grows strong by a sense of community of interests. One speech, one literature, one race, one tradition imposing themselves victoriously upon every individual produce an impregnable solidiarity. It is when the social mind is broken and confused, when it is distracted in its aims and purposes, when it halts between hope and fear, that a people become decadent. The nation is already defeated that has lost singleness of aim and faith in its own future. A nation as well as an individual may suffer from nervous shock—such a shock Great Britain had in the Boer War—and the result is exhibited in various forms of hysteria—some of them under the guise of very humane proposals.

Merely biological therories are staggered by the facts of history. It is time to have done with regarding man as simply the highest of the mammals whose breed can be improved by the methods of the stock farm. The problems of race are at once deeper and vaster. As Herbert Spencer's biological interpretation of society has been practically abandoned, notwithstanding his immense services to modern knowledge, so eugenics must follow the path of sociology and give larger room for psychological forces.

The greatest events in history have no corresponding changes in human physique. Japan won against Russia, not because of a larger brain, for physically the Japanese remains as he has been for a thousand years, but because of the impulse of a new passion and the dominance of a new idea. The Moslem did not take sword in hand because of the invention of a new breakfast food or a fresh system of ventilation, but because the dull eyes of the sons of Ishmael had found their own Moses.

To return to our present problems. Without a doubt we are interested that the conditions of physical life and labour in any social group to which we are attached shall be the best possible. It is important that children should be well born. There are certain conclusions which are not sentimental, but on the contrary are essentially economic:

(*a*) Hard labour must be forbidden to the expectant mother. In some communities this has found expression in maternity pensions. I am not here, however, as the advocate of any pension system.

(*b*) A woman should have nourishing food both before and after motherhood.

(*c*) The physical surroundings must be wholesome.

It would seem to be the duty of the municipal state to secure the proper physical environment for the home; because that is a problem too large to be solved in any municipality by the individual. It is a part of the problem of public health. The new social conscience asserts that every

child born into the world should have an adequate physical, intellectual, and industrial opportunity; but the movement looking to the triumph of a vital democracy, in which the child of the cottage shall be as much in the thought of the State as the child of the palace, is more important to every group than the political or the industrial democracy. We please ourselves by seeking to throw some light upon the gloom of poverty; the pinched and pale-faced boy in the arms of a ragged woman are the new Madonna and Child of our generation.

This is a company of frank men and women, and we must be ready to face the fact that the problem of the child in the home of the better classes is just as important and much more difficult of solution. We can defend municipal activity in behalf of the poor, by saying that the economic cost of caring for the mother is more than paid to the State in the increased vitality and consequent earning power of the coming generation. But who will see to it that the children of the better classes are well-born and furnished with a sufficient stock of vitality for human leadership? It is well enough to deplore that too many children come into the homes of squalor, and that the poor and the ignorant do not and cannot properly care for them. But what voice can make itself understood when it declares that the problem of the upper classes is always the greatest problem of any people. The problem of parenthood from this point of view becomes fundamentally an ethical problem. It is one that defies legislation, that mocks at literature, and that ignores religion. We mourn over the vices of the poor, but it is still true that the vices of the rich are more serious and more numerous. Hence it is that the solution of the problem of Eugenics must at last be psychical and ethical.

We shall make faster progress in work represented by this Congress if we frankly recognise some of our limitations. The first I shall indicate rather than discuss. It is the fact generally recognised that the population expands to the food supply. It were, perhaps, a closer statement to say that it expands to the economic limit indicated by the standard of living. If conditions are easy, marriages are early and prolific, and the vital human force does not yield to either law or reason.

Another limitation with which we have to do is the chaotic condition of present opinion on the subject of heredity among normal beings. A great deal of investigation and discussion has already taken place with reference to heredity among the abnormal classes, but the real problem is not here. The social group is actually composed of those whom we call normal, who are able to earn their own living, manage their own affairs, and associate upon some terms with their fellow men.

Very little progress has been made, and very little dependable data secured pointing to an improvement of the race by conscious choice. The outstanding facts of heredity are the gift of strength or weakness, owing sometimes to the organisation of the parent—particularly the mother, but

owing often to external conditions. The organs, faculties, and forces which go to make up a human being are so numerous, and the possible combinations are so vast beyond our calculation, that no one can predict the results of any particular union. This is indicated by the notorious differences among children of the same parents, brought up under the same conditions, who refuse to conform to the family type even under the strongest pressure of social and intellectual forces.

It is idle to say that the children of persons of talent are more likely to show ability than children from the average home. Parents of talent are able to give exceptional advantages to their children, and ought to show a greater number of successes. There is not the slightest evidence that talent of any particular form is ever inherited. Neither Luther nor Napoleon, or Abraham Lincoln were anything less than biological surprises. Beethoven, Mozart, and Wagner could no more have been predicted than William Shakespeare or Michael Angelo.

The surprises of sainthood are no less remarkable than those of genius. St. Francis D'Assisi, Catherine of Siena, and Florence Nightingale had no ancestry for their character and their work.

In our time, less than ever before in the worlds history, is there any definite relation between social efficiency and physical fitness. The group cannot afford to be anything less than as robust and healthy as it is possible, for the activities of the group rest upon material foundations; nations require soldiers and manual labour needs muscle. But some of the most efficient individuals have been born with bad bodies and have been doomed to poor health. When Emmanuel Kant went to study philosophy in a German university, it is said that he was advised not to attempt the task because of his weak chest. He replied he would ignore his chest, and became the great teacher of the modern intellect. Herbert Spencer was so delicate as a child that he was not given a regular education, but no Englishman had a more marked influence upon his generation. Charles Kingsley was the prophet of muscular Christianity, but Robertson, of Brighton, was the greater preacher. There was a boy born in the Midlands so small and frail that even an English nurse did not think it worth while to keep him alive; but the little chap lived, grew to see an apple fall, and became Sir Isaac Newton. We cannot afford to adopt the Greek plan of throwing away unpromising infants.

The most valuable work that can be undertaken by those interested in Eugenics is to apply the sense of social solidarity to the proper care of those children who are born into the world under the terms that now obtain. The fact is, nature is luxurious in life and resourceful in carrying out her aims. She is continually trying to repair the ravages which failure and folly make upon the strength of one generation by producing a new Adam and Eve for the fresh Garden of Eden. Nearly all children are well born. With a wider knowledge of hygiene, a better distribution of wealth and

leisure, and a higher sense of personal reponsibility on the part of the parents, the problem of heredity from the physical point of view would practically vanish.

Dr. Chapin, of the Children's Department of the Graduates' Hospital in New York City, investigated 600 cases of children admitted to this institution. They were a sorry lot gathered together from the slums of New York, and suffering from maimed, dwarfed, and depleted bodies. But when their history was carefully traced out, it was found that only 22 out of the 600 were badly born. The period of infancy among the poor is not only characterised by a terrible death-rate, but foul air, improper food and worse cooking; sickness, and accident rob those who survive of that measure of strength and beauty which is their due. The great problem of the world is not how to bring better babies into the world, but how to take care of such as come. The tragedy of the world is spoiled babies.

NOTE.

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